

Instructions-Parts ProControl 1KE® Kits for Management of Fluid and Air



3A2614F
EN

Use to monitor and control flow rate and track material use. For professional use only.

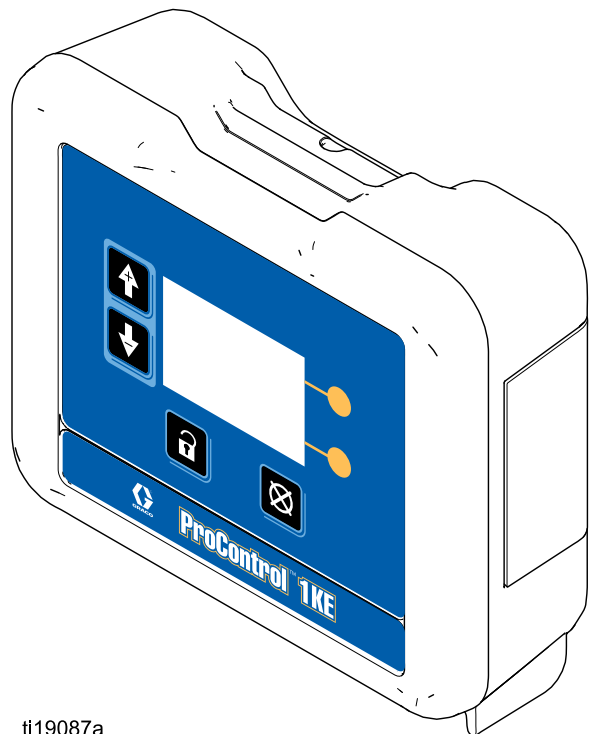


Important Safety Instructions

Read all warnings and instructions in this manual. **Save these instructions.**

See the G3000 meter manual (308778) or Coriolis meter manual (313599) for flow meter maximum working pressure.

See page 3 for kit information, including approvals.



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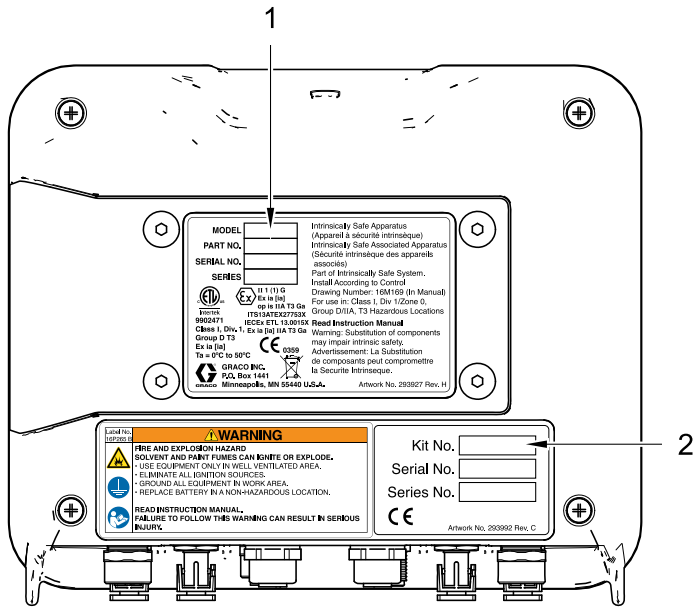
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ProControl 1KE Models and Kits

All Advanced Display Control Modules (ADCM) are base model number 24L097 (Ref. 1). Models 24L097 and 24N672 (ADCM with bracket) are not available for separate sale. See approval information in Manual 332013 and on this page. The small label (Ref. 2) on the back of the module shows the ProControl 1KE Kit number. Available kits are described in the tables that follow.



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Model No.	Series	Description
24L097	A	Advanced Display Control Module (ADCM), with no software loaded. See Manual 332013.
24N672	A	Advanced Display Control Module (ADCM) with bracket, with no software loaded. See Manual 332013.

 Intertek 9902471 Class I, Div. 1, Group D T3 Ex ia [ia] Ta=0°C to 50°C Intrinsically Safe Apparatus Part of Intrinsically Safe System. For use in Class I, Division 1, Group D T3 Hazardous Locations See Manual 332013, Appendix A, Control Drawing 16M169 for entity parameters.	 0359  II 1 (1) G Ex ia [ia] op is IIA T3 Ga ITS13ATEX27753X Ta=0°C to 50°C Ex ia [ia] IIA T3 Ga IECEx ETL 13.0015X Ta=0°C to 50°C
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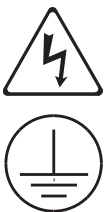
ProControl 1KE systems are not approved for use in hazardous locations unless all accessories and all wiring meet local, state, and national codes.

Kits for Hazardous Locations								
Kit No.	Series	Configuration						
		ProControl 1KE Module with bracket (Manual 332013)*	No Power	AC Power with barrier**	G3000 Meter (Manual 308778)*	I/P Transducer	Fluid Regulator (Manual 3A0427)*	Pressure Transducer (Manual 407045)*
24L083	A	✓	✓					
24R261	A	✓	✓		✓	✓		
24R262	A	✓	✓		✓	✓	✓	
24R263	A	✓	✓			✓	✓	
24L085	A	✓		✓		✓	✓	
24P593	A	✓		✓		✓		✓
24P595	A	✓		✓	✓	✓		
24L087	A	✓		✓	✓	✓	✓	
24P597	A	✓		✓		✓	✓	✓
24L089	A	✓		✓	✓	✓	✓	✓
24L091	A	✓		✓		✓		
		* See component manuals for additional approval information.						
		** Must not be installed in Hazardous Location.						

Kits for Non-Hazardous Locations							
Kit No.	Series	Configuration					
		ProControl 1KE Module with bracket	AC Power	G3000 Meter	I/P Transducer	Fluid Regulator	Pressure Transducer
24L084	A	✓	✓		✓	✓	
24P592	A	✓	✓		✓		✓
24P594	A	✓	✓	✓	✓		
24L086	A	✓	✓	✓	✓	✓	
24P596	A	✓			✓	✓	✓
24L088	A	✓	✓	✓	✓	✓	✓
24L090	A	✓	✓		✓		
 Intertek 9902471 Conforms to/Certified to UL/CSA Standard 61010-1							

Warnings

The following warnings are for the setup, use, grounding, maintenance and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbol refers to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

 WARNING	
	FIRE AND EXPLOSION HAZARD Flammable fumes, such as solvent and paint fumes, in work area can ignite or explode. To help prevent fire and explosion: • Use equipment only in well ventilated area. • Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc). • Keep work area free of debris, including solvent, rags and gasoline. • Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present. • Ground all equipment in the work area. See Grounding instructions. • Use only grounded hoses. • Hold gun firmly to side of grounded pail when triggering into pail. Do not use pail liners unless they are antistatic or conductive. • Stop operation immediately if static sparking occurs or you feel a shock. Do not use equipment until you identify and correct the problem. • Keep a working fire extinguisher in the work area. Static charge may build up on plastic parts during cleaning and could discharge and ignite flammable vapors. To help prevent fire and explosion: • Clean plastic parts only in a well ventilated area. • Do not clean with a dry cloth.
	ELECTRIC SHOCK HAZARD This equipment must be grounded. Improper grounding, setup, or usage of the system can cause electric shock. • Turn off and disconnect power at main switch before disconnecting any cables and before servicing or installing equipment. • Connect only to grounded power source or grounded electrical outlets. • Use only 3-wire extension cords. • Ensure ground prongs are intact on power and extension cords. • Do not expose to rain. Store indoors. • All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.



WARNING



INTRINSIC SAFETY

Intrinsically safe equipment that is installed improperly or connected to non-intrinsically safe equipment will create a hazardous condition and can cause fire, explosion, or electric shock. Follow local regulations and the following safety requirements.

- Be sure your installation complies with national, state, and local codes for the installation of electrical apparatus in a Class I, Group D, Division 1 Hazardous Location, including all of the local safety fire codes, NFPA 33, NEC 500 and 516, and OSHA 1910.107.
- Equipment that comes in contact with intrinsically safe terminals must meet the entity parameter requirements specified in Control Drawing 16M169. See Appendix A in Manual 332013. This includes safety barriers, DC voltage meters, ohmmeters, cables, and connections. Remove the unit from the hazardous area when servicing.
- If a printer, computer, or other electrical component is connected, it must be used in conjunction with a safety barrier.
- Without the safety barrier, the equipment is no longer intrinsically safe and must not be operated in hazardous locations, as defined in article 500 of the National Electrical Code (USA) or your local electrical code.
- Do not install equipment approved only for non-hazardous location in a hazardous area. See the ID label for the intrinsic safety rating for your model.
- Ground the power supply. A voltage limiting safety barrier must be properly grounded to be effective. For proper grounding, use a 12 gauge minimum ground wire. The barrier's ground must be within 1 ohm of true earth ground.
- Do not operate the power supply module with the cover removed.
- Do not substitute system components as this may impair intrinsic safety.



SKIN INJECTION HAZARD

High-pressure fluid from gun, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. **Get immediate surgical treatment.**

- Engage trigger lock when not spraying.
- Do not point gun at anyone or at any part of the body.
- Do not put your hand over the spray tip.
- Do not stop or deflect leaks with your hand, body, glove, or rag.
- Follow the **Pressure Relief Procedure** when you stop spraying and before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses and couplings daily. Replace worn or damaged parts immediately.

 WARNING	
 	EQUIPMENT MISUSE HAZARD Misuse can cause death or serious injury. • Do not operate the unit when fatigued or under the influence of drugs or alcohol. • Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See Technical Data in all equipment manuals. • Use fluids and solvents that are compatible with equipment wetted parts. See Technical Data in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS from distributor or retailer. • Do not leave the work area while equipment is energized or under pressure. • Turn off all equipment and follow the Pressure Relief Procedure when equipment is not in use. • Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only. • Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards. • Make sure all equipment is rated and approved for the environment in which you are using it. • Use equipment only for its intended purpose. Call your distributor for information. • Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. • Do not kink or over bend hoses or use hoses to pull equipment. • Keep children and animals away from work area. • Comply with all applicable safety regulations.
	TOXIC FLUID OR FUMES Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed. • Read MSDSs to know the specific hazards of the fluids you are using. • Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.
	PERSONAL PROTECTIVE EQUIPMENT Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This protective equipment includes but is not limited to: • Protective eyewear, and hearing protection. • Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer.

Overview

The ProControl 1KE Advanced Display Control Module is an electronic flow control and fluid monitoring system. The ProControl 1KE performs the following functions:

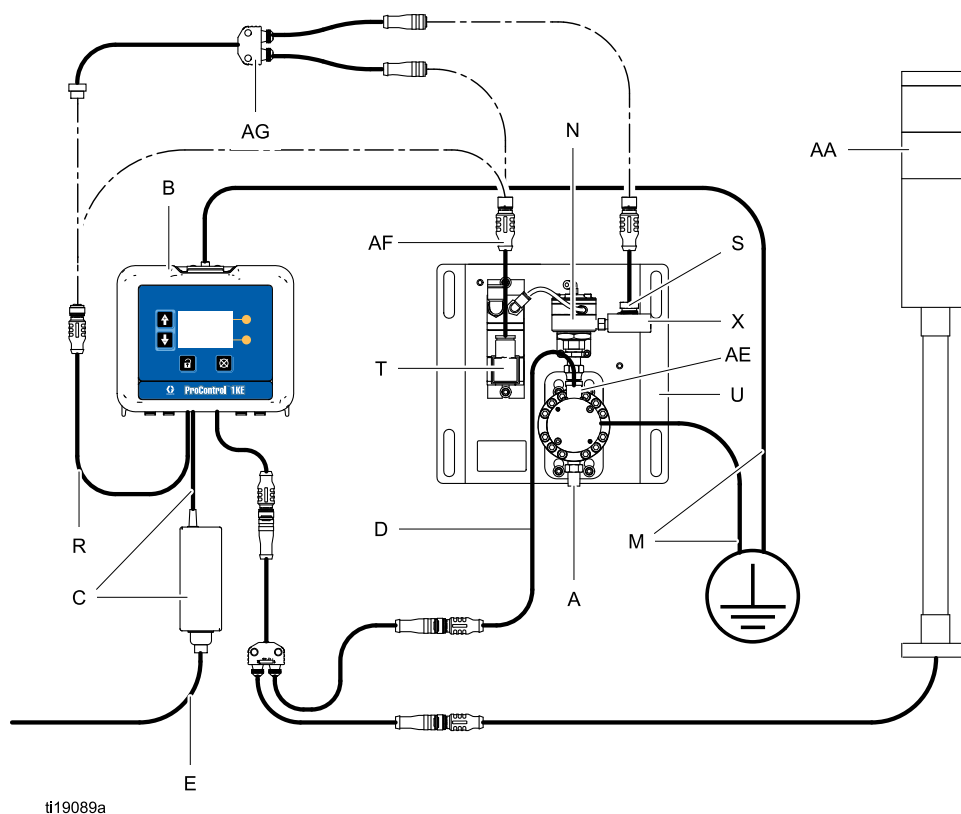
- Manages fluid pressure or flow rate.
- Manages the fan air.
- Shows real-time fluid flow rate.
- Displays a resettable batch totalizer.
- Monitors and reports overall fluid use.
- Alarms if the flow rate is too fast or too slow for the user-set targets.
- Alarms when the maintenance total is reached for the user-set target.
- Displays a log of the last 20 alarms.

The ProControl 1KE is available in configurations for installation in Hazardous Locations or Non-Hazardous locations. The power supply for Hazardous Locations comes with one barrier, to power one ProControl 1KE. Up to three additional barriers can be added to the power supply to power three additional ProControl 1KEs. See [Accessories, page 43](#), to order additional barriers. Order ProControl 1KE Kit 24R261, 24R262, or 24R263,, based on your choice of the fluid management compononets. These kits do not include a power supply.

Installation

Non-Hazardous Locations

NOTE: Kits supplied with an AC/DC Converter are shipped with a North American 120 VAC power cord (E). Users in areas with another standard voltage must provide a power supply cord with an IEC 320-C13 female converter. See [Technical Data, page 53](#) for power requirements.



Key:

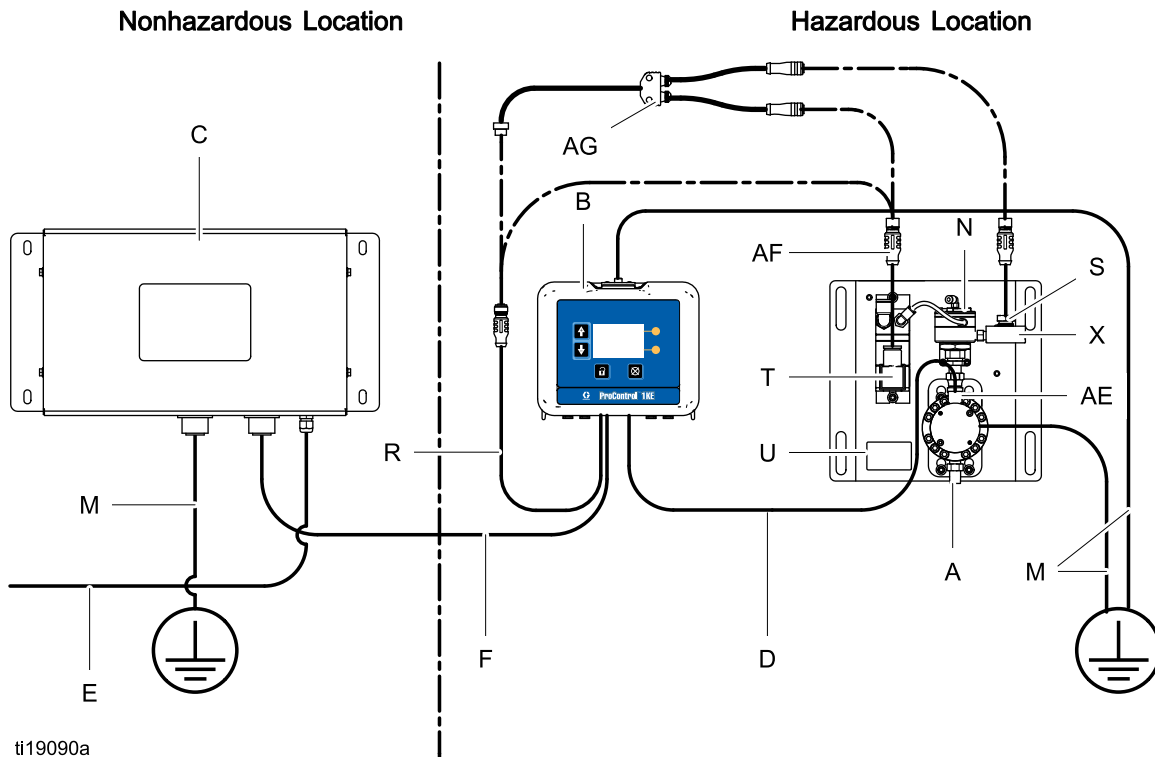
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|----------|--|-----------|--|
| A | Flow Meter Fluid Inlet, 1/4 npt female inlet/outlet. | N | Fluid Regulator, 1/8 npt (f) outlet |
| B | ProControl 1KE Module with Bracket | R | Fluid Control Cable |
| C | Power Supply and Cable (6 ft., 2 m), to terminal 3. See Cable Connections, page 13 . | S | Pressure Transducer |
| D | Meter Cable (50 ft., 15 m), to terminal 4. See Cable Connections, page 13 . | T | I/P Transducer (Current to Pressure). See Air Connections, page 15 . |
| E | Power Cord (10 ft., 3 m), see NOTE above. | U | Mounting Panel. See Mounting Dimensions, page 44 . |
| M | Ground wire and clamp. PN 244524 is included with kits to ground the ProControl 1KE Module. PN 238909 is sold separately to ground the meter and other components. | X | Pressure Transducer Fitting, 1/8 npt (f) inlet and outlet |
| | | AA | Light Tower with Splitter (accessory) |
| | | AE | Flow Meter Fluid Outlet, 1/4 npt (f) |
| | | AF | Pressure Transducer Cable |

Hazardous Locations

		
Do not substitute or modify system components as this may impair intrinsic safety. For installation, maintenance, or operation instructions, read instruction manuals. Do not install equipment approved only for non-hazardous location in a hazardous location. See the identification label for the intrinsic safety rating for your model.		

Intrinsically safe equipment should not be used with a power supply that has no barrier. Do not move units from a non-IS setup to an IS setup. IS equipment that has been used with a non-IS power supply must not be returned to a hazardous location. Always use an intrinsically safe power supply with IS equipment.

- Installation should be in accordance with ANSI/ISA RP12.06.01, "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations," and the National Electrical Code® (ANSI/NFPA 70).
- Installation in Canada should be in accordance with the Canadian Electrical Code, CSA C22.1, Part 1, Appendix F.
- For ATEX, install per EN 60079-14 and applicable local and national codes.
- Multiple earthing of components is allowed only if a high integrity equipotential system is realized between the points of bonding.
- Do not remove any cover until power has been removed.
- Install according to Control Drawing Number 16M169. See Appendix A in Manual 332013.



Key:

A	Flow Meter, 1/4 npt female inlet/outlet	N	Fluid Regulator
B	ProControl 1KE Module with Bracket	R	Fluid Control Cable
C	Power Supply with Barrier	S	Pressure Transducer
D	Meter Cable (50 ft., 15 m), to terminal 4. See Cable Connections, page 13 .	T	I/P Transducer (Current to Pressure). See Air Connections, page 15 .
E	Power Cord (not supplied)	U	Mounting Panel. See Mounting Dimensions, page 44 .
F	Power Cable (50 ft., 15 m) to terminal 3. See Cable Connections, page 13 .	X	Pressure Transducer Fitting, 1/8 npt (f) inlet and outlet
M	Ground wire and clamp. PN 244524 is included with kits to ground the ProControl 1KE Module. PN 238909 is sold separately to ground the meter or other component.	AE	Flow Meter Fluid Outlet, 1/4 npt (f)
		AF	Pressure Transducer Cable

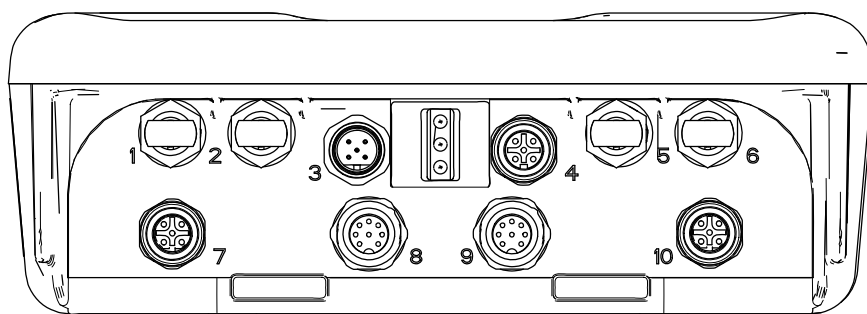
Grounding

					
The equipment must be grounded to reduce the risk of static sparking and electric shock. Electric or static sparking can cause fumes to ignite or explode. Improper grounding can cause electric shock. Grounding provides an escape wire for the electric current.					

NOTE: The ProControl 1KE does not provide 500 VAC isolation through the coupling nuts on the enclosure. The associated apparatus and the field apparatus cable shields must not be connected to the ProControl 1KE coupling nuts.

1. **Power Supply 16M167:** Connect the ground wire from the power supply to a true earth ground.
2. **ProControl 1KE Module:** Connect a ground wire and clamp to the screw on the top of the bracket. Connect the other end to ground. In an IS system, the ProControl 1KE also is grounded by connection to the grounded power supply.
3. **Flow Meter:** Follow the instructions in manual 308778 (G3000) or manual 313599 (Coriolis) to ground the flow meter and check its electrical grounding continuity.
4. **Fluid and Air Control:** Ground through connection to the mounting panel that also holds the grounded flow meter.
5. **Fluid Supply:** Ground the fluid supply unit.

Cable Connections



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Port	Description	Connection
1	Fiber Optic Receiver	Red Lead from TX on Fiber Optic Converter (PN 16K465) or from Port 6 on another ProControl 1KE (or Informer)
2	Fiber Optic Transmitter	Black Lead to RX on Fiber Optic Converter (PN 16K465) or to Port 5 on another ProControl 1KE (or Informer)
3	Power	From Power Supply
4	Digital Input/Output	To/From Meter and Light Tower (Accessory)
5	Fiber Optic Reciever	Black Lead from Port 2 on another ProControl 1KE (or Informer)
6	Fiber Optic Transmitter	Red Lead to Port 1 on another ProControl 1KE (or Informer)
7	Analog Input	To/From Pressure Transducer Cable
8	Flow Control	To/From Flow Control Cable
9	Motor Control	Not used.
10	Digital Input/Output	Not used.

Electrical Connections

Install per Graco Control Drawing 16M169, in Manual 332013. See also Figure 1.

1. Connect main power supply cord (E, not supplied) through strain relief to terminals L and N on the power supply unit.
Note: Use either strain relief (5) or (6), depending on the size of the cord.
2. Connect power cord ground wire (W) to ground terminal block (Y).
3. Connect IS power cable (F) per the following table.

Table 1 Power Barrier Wiring Connections

Power Cable Leads	Barrier Connection
Brown (power)	Connector 1
Blue (common)	Connector 2
Glossy Black (ground) and Black (drain) connect to ground block.	

**Table 2 I/P Transducer Wiring Connections;
Cables 16P790 (non-IS) and 16V142 (IS)**

Wiring Table Wire Color	Function	DIN Connector
Gray	Control A	Connector 1
Blue	Common	Connector 2

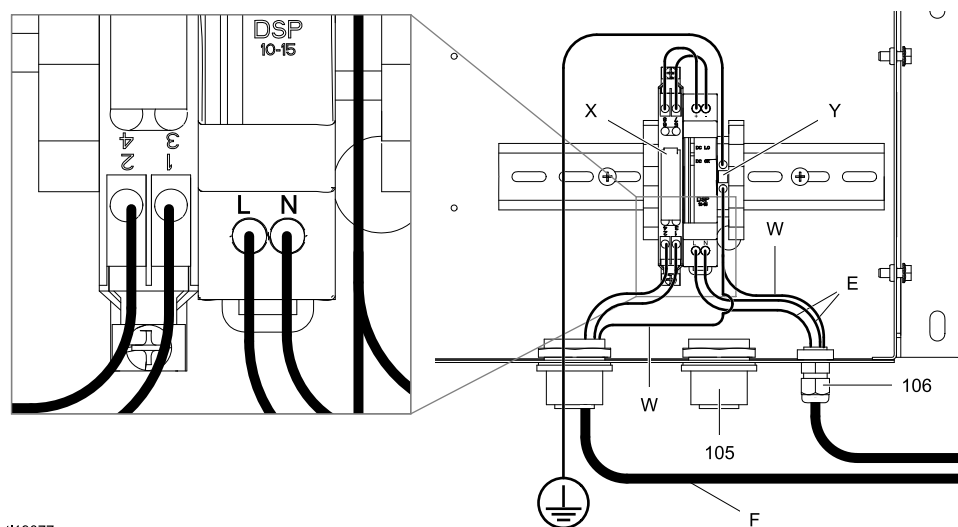


Figure 1

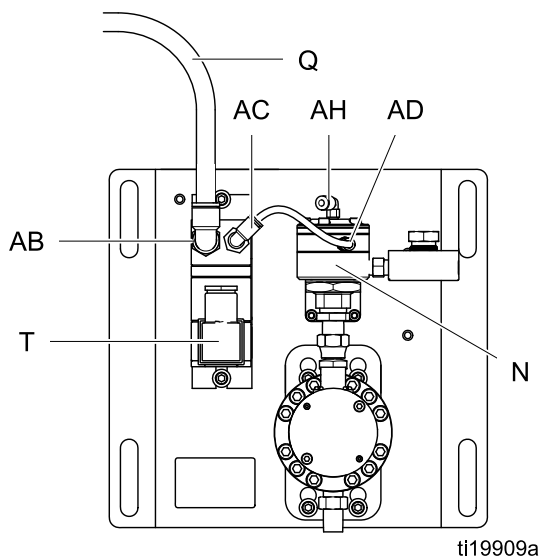
KEY

- E Inbound AC Power Cord
- F Power Cable
- W Ground Wires
- X Barrier
- Y Ground Block
- 5 Strain Relief Fitting
- 6 Strain Relief Fitting

Air Connections

NOTICE

To avoid damage to the I/P transducer, use clean, dry, oil-free air, filtered through at least a 40 micron filter.



1. Connect incoming air line (Q) to 1/4 in. npt (f) inlet (AB) on I/P transducer (T). Kits with a fluid regulator (See [Parts, page 34](#)), include a 3/8 tube fitting.
2. **Kits with fluid regulator:** Check that the air tube is connected from 5/32 tube fitting (AC) on I/P transducer to 5/32 tube fitting (AD) on fluid regulator (N).
Other Kits: The air outlet is 1/4 in npt (f).

The I/P transducer exhausts a small amount of air whenever air is connected, whether or not the system is operating.

NOTE:

- The top port (AH) on the fluid regulator can be used for high-speed flushing with an independent air source. Set the air pressure **higher** than the side port (AD) air pressure.
- Flushing air pressure must be removed from the top port (AH) to return to the previous flow setting.

Communication Options

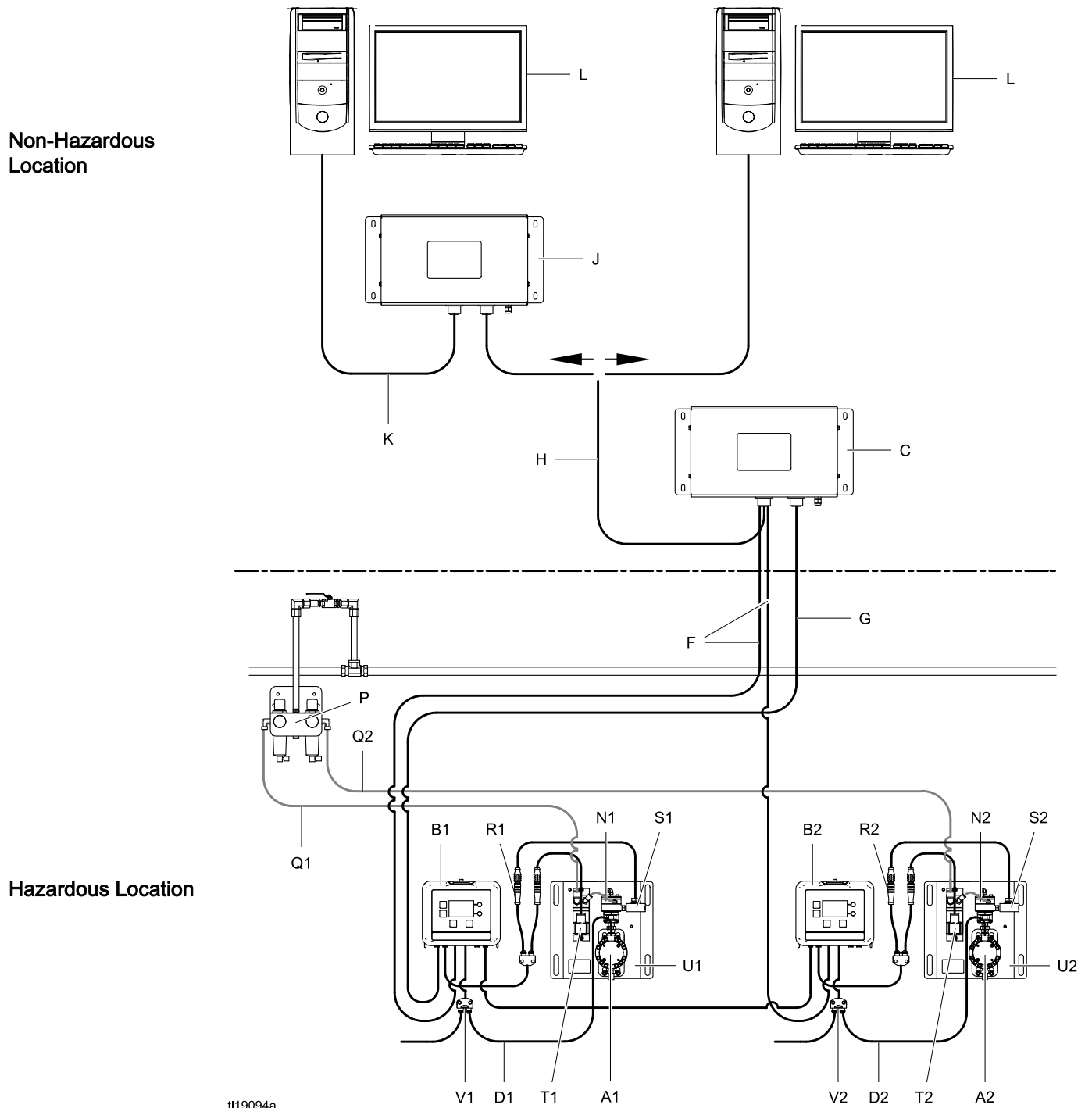
Graco Accessories are available to enable communication with a Programmable Logic Controller (PLC) or Personal Computer (PC).

- The Fiber Optic Converter (Graco Kit 24N978) enables Modbus RTU communication with a user-supplied PLC using a serial cable.
- A Modbus Gateway (Graco Kit 24N977) used with a Fiber Optic Converter (Graco Kit 24N978) enables Modbus TCP communication with a user-supplied PLC.

- A Modbus Gateway (Graco Kit 24N977) can be connected to (or installed in) an Advanced Web Interface (Graco Kit 15V377) to enable communication with a PC using an ethernet cable. See [Appendix B - Advanced Web Interface, page 48](#), for instructions.

These communication kits come with installation and setup directions necessary for their use with the ProControl 1KE.

Typical Installation



Key		
A1 and A2	Flow Meter	Supplied in some kits. See Parts, page 34.
B1 and B2	ProControl 1KE Module with Bracket	Supplied
C	Power Supply and Barrier	Supplied in Hazardous Location Kits
D1 and D2	Meter Cable (50 ft., 15 m)	Supplied in kits with meter
E	Power Cord (10 ft., 3 m), not shown	Supplied in Non-Hazardous Location Kits
F	Power Cable (50 ft., 15 m)	Supplied
G	Fiber Optic Cable (100 ft., 30 m)	Accessory
H	Serial Cable	Accessory
J	Advanced Web Interface	Accessory
K	Ethernet Cable	Accessory
L	Personal computer	Not supplied.
N1 and N2	Fluid Regulator	Supplied in some kits. See Parts, page 34.
P	Air Control Module	Accessory
Q1 and Q2	Air Lines	Not supplied
R1 and R2	Flow Control Cable	Supplied
S1 and S2	Pressure Transducer	Supplied in some kits. See Parts, page 34.
T1 and T2	I/P Transducer (Current to Pressure)	Supplied
U1 and U2	Mounting Panel	Supplied
V1 and V2	Splitter to meter and light tower (non-hazardous installations) or IS cable kit for hazardous location installations.	Accessory
W1 and W2	Pressure Transducer Cable.	Supplied in some kits. See Parts, page 34.

Operation



Pressure Relief Procedure



Follow the Pressure Relief Procedure whenever you see this symbol.



This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure when you stop spraying and before cleaning, checking, or servicing the equipment.

1. Turn off the fluid supply to the meter.
2. Set the Flow Rate Percent to at least 50 percent.
3. Follow the **Pressure Relief Procedure** for your fluid system dispensing device.
4. Reduce the Flow Rate Percent to 0 percent.

NOTICE

To avoid damage to the I/P transducer, always set the Flow Rate Percent to 0 before reducing air pressure to the system.

Fluid Regulator Operation

Follow instructions in the fluid regulator manual to set up, flush, and adjust the fluid regulator prior to use.

Flow Meter Operation



To reduce the risk of component rupture, which could cause injury from splashing fluid, do not exceed the maximum working pressure of your meter or any component or accessory in your system.

For information on the G3000 Graco flow meter, see manual 308778. For information on the Coriolis flow meter, see manual 313599. Calibrate the meter as instructed before using the meter for production.

NOTICE

The flow meter gears and bearings can be damaged if they rotate at too high a speed. To avoid high speed rotation, open the fluid valve gradually. Do not over-speed the gear with air or solvent. To prolong meter life, do not use the meter above its maximum flow rate.

Calibrate the Meter

NOTE: See **Setup Screen 5** for further screen information, if needed.

When to Calibrate

- The first time the system is operated.
- Whenever new materials are used in the system, especially if the materials have viscosities that differ significantly.
- As part of regular maintenance to retain meter accuracy.
- Whenever a flow meter is serviced or replaced.

Read Before Calibration

- Meter k-factor on **Setup Screen 5** is updated automatically after the calibration procedure is completed. You also may manually edit the k-factor if desired.
- All values on this screen are in cc or cc/pulse, regardless of the units set in the other Setup screens.
- Before calibrating the meter, be sure the system is primed with material.
- Disable alarms before calibration.

Calibration Steps

1. Press  to enter Setup Mode.
2. Press  to move to Setup Screen 5.
3. Press  to enter the screen.
4. Press  to begin the calibration.

5. Dispense about 300–500 cc of material into a graduated cylinder. The amount the system measures will display in the measured volume field .
6. Press  to end the calibration.
7. Press  to get to the dispensed volume field , then press  to enter the field. Enter the amount of material in the cylinder.
8. After the volume is entered, the system calculates the new k-factor  and shows it on Setup Screen 5.
NOTE: To clear the counter and begin the calibration again, press , move briefly to another screen, then return to Setup Screen 4 and start over. If you press  without leaving the screen, the counter will continue from where it is, without clearing.
9. Press  to exit the screen.
10. Press  to exit Setup Mode.

Set the Modbus Addresses

See **Setup Screen 7**. By default, the Modbus is set to Off . If you need the Modbus, set the Modbus mode to SLAVE . The address value is between 1 and 247. The modbus address corresponds to the address of the ProControl 1KE. See Appendix A for further information.

Set the Flow Rate Percent

1. **System Setup:** See [Setup Screen 2, page 27](#) to set the upper and lower limit within which the operator can adjust the flow rate. The settable range is 0 to 99.9 percent, but the I/P pressure transducer requires a minimum of 22 to 25 flow rate percent target to start flow. Therefore, the operational range is about 22 to 99.9 percent. See Table 1.

Table 3

Flow Rate Target	I/P Current	Effect
0–about 20 percent	0–4.0 mA	No flow
22%–25%	4.4–5.0 mA	Lowest flow rate
55% — 60%	11–12 mA	Middle flow rate
99.9%	20 mA	Highest flow rate

2. **Operator:** See [Run Screen 1, page 24](#) to adjust the flow rate within the set limits.

Update the Software

Software updates are installed using a software token (PN 16P892), which is sent automatically when a new version of the software is released. Manual 3A1244 will accompany any necessary software updates. Follow all instructions and warnings in Manual 3A1244 to update your ProControl 1KE software.

Replace the Battery

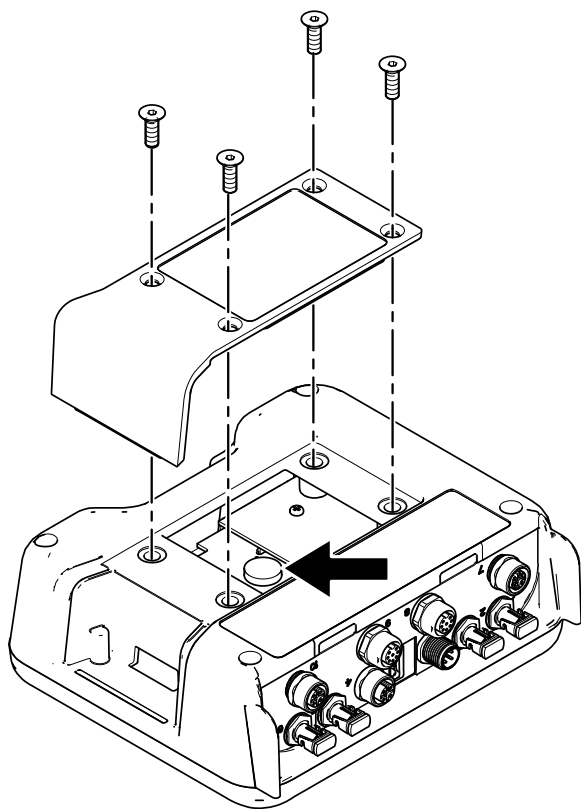
Replace the battery only if the clock stops functioning after disconnecting power or a power failure.

				
Sparking can occur when changing the battery. Replace the battery only in a non-hazardous location, away from flammable fluids or fumes.				

NOTICE

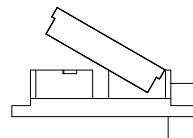
To avoid damage to the circuit board, wear Part No. 112190 grounding strap, and ground appropriately.

1. Disconnect power.
2. Remove the module from the bracket.
3. Attach the grounding strap.
4. Remove 4 screws, and then remove the access cover.



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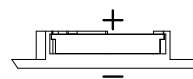
5. Use a flathead screwdriver to pry out the old battery.



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NOTE: Dispose of battery properly in an approved container and according to applicable local guidelines.

6. Replace with new battery. Ensure battery fits under connector tabs before snapping other end in place.



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NOTE: Use only Panasonic CR2032 batteries for replacement.

7. Reassemble access cover and screws.
8. Snap the module back into the bracket.

Display Module

Display Information

The Display Module provides the interface for users to enter selections and view information related to setup and operation.

The screen backlight is factory set to remain on, even without screen activity. See **Setup Screen 4** to set the backlight timer to your preference. Press any key to restore.

Keys are used to input numerical data, enter setup screens, navigate within a screen, scroll through screens, and select setup values.

NOTICE

To prevent damage to the softkey buttons, do not press the buttons with sharp objects such as pens, plastic cards, or fingernails.

Operation Modes

The ProControl 1KE has two operation modes: Run Mode and Setup Mode. For detailed information see [Run Screens, page 24](#), and [Setup Screens, page 26](#).

Press  to toggle between these two modes.

Screen Navigation and Editing

Refer to this section if you have questions about screen navigation or about how to enter information and make selections.

All Screens

1. Use   to move between screens.
2. Press  to enter a screen. The first data field on the screen will highlight.

3. Use   to highlight the data you wish to change.

4. Press  to edit.

Drop Down Field

1. Use   to highlight the correct choice from the dropdown menu.
2. Press  to select.
3. Press  to cancel.

Number Field

1. The first digit will be highlighted. Use   to change the number.
2. Press  to move to the next digit.
3. When all digits are correct, press  again to accept.
4. Press  to cancel.

Check Box Field

A check box field is used to enable or disable features in the software.

1. Press  to toggle between  and an empty box.
2. The feature is enabled if a  is in the box.

Reset Field

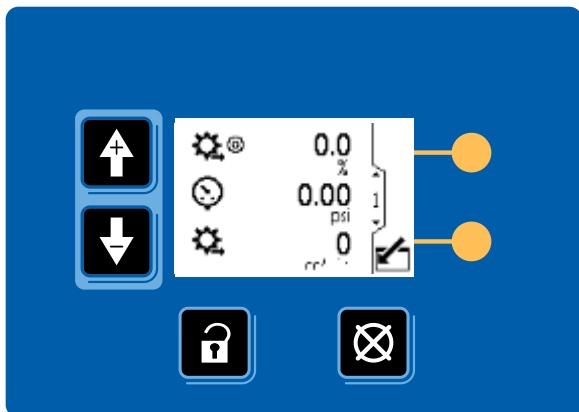
The reset field is used for totalizers. Press  to reset the field to zero.

When all data is correct, press  to exit the screen.

Then use   to move to a new screen, or  to move between Setup Mode and Run Mode.

Icons

As you move through the ProControl 1KE screens, you will notice that most information is communicated using icons rather than words to simplify global communication. The detailed screen descriptions in [Run Screens, page 24](#), and [Setup Screens, page 26](#), explain what each icon represents. Icon reference tables also are provided, on this page and the next. Softkeys are membrane buttons whose function correlates with the screen content to the immediate left of the button.



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Membrane Keys	Softkeys
 Press to toggle between Run mode and Setup Mode.	 <i>Enter Screen.</i> Highlight data that can be edited. Also changes the function of the Up/Down arrows so they move between data fields on the screen, rather than between screens.
 <i>Error Reset:</i> Use to clear alarm after cause has been fixed. Also used to cancel data entered and return to original data.	 <i>Exit Screen.</i> Exit data editing.
 <i>Up/Down Arrows:</i> Use to move between screens or fields on a screen, or to increment or decrement the digits in a settable field.	 <i>Enter.</i> Press to activate a field for editing or to accept the highlighted selection on a dropdown menu.
 <i>Softkeys:</i> Use varies by screen. See column at right.	 <i>Right.</i> Move to the right when editing number fields. Press again to accept the entry when all digits are correct.
	 <i>Reset.</i> Reset totalizer to zero.
	 Start
	 Stop

Screen Icons	
Screen number. The arrows indicate more screens are available to view.	Lock icon indicates the unit is in Setup.
Batch Totalizer	Batch Units
Maintenance Totalizer	Maintenance Target
Grand Totalizer	Set Grand Total Units
Fluid Flow Percent Target	Fluid Pressure
Fluid Flow Rate	Set Modbus Mode
Set Modbus Address	Set Serial Port Baudrate
Set Serial Port Parity	Modbus Functionality is Off
Set Upper and Lower Limits for Fluid Flow Percent	ProControl 1KE is Modbus Slave

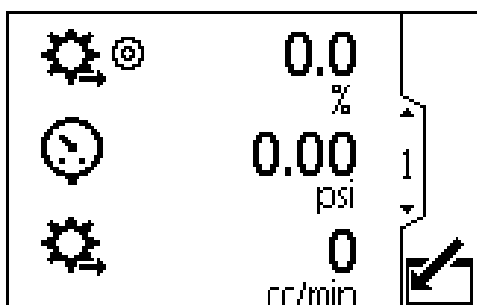
Screen Icons	
Set Pressure Units	Set Maximum and Minimum Flow Rates
Set Flow Rate Units	Maintenance Totalizer Alarm Enable
Flow Rate Alarm Enable	Set Alarm Auto Clear (to clear alarm on ac- cessories)
Set Backlight Timer	Volume measured by the meter
Actual volume dispensed	K-Factor
Select Pressure Transducer	Set Zero Offset
Display or adjust pres- sure transducer slope	F3 Flow Rate High Alarm
MF Maintenance Alarm	F2 Flow Rate Low Alarm
Select Correct Date	Select Date Format
Set the Correct Time	Enter User-Set Password

Run Screens

When in Run Mode, the ProControl 1KE displays the flow rate percent target, actual fluid pressure, and current flow rate on Screen 1. Screen 2 displays the batch total and grand total for the flow meter to which it is connected. Screens 3–6 display a log of the last 20 alarms.

Run Screen 1

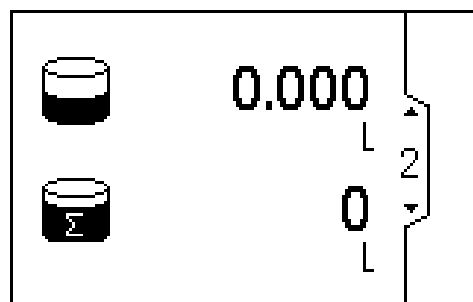
Use this screen to view or reset the flow rate percent target, and to view the actual fluid pressure and flow rate. Units are set on Setup Screen 1 and Setup Screen 2.



Key	
	Enter the screen.
	Flow Rate Percent Target — Operator settable within the range defined on Setup Screen 2.
	Displays current fluid pressure if equipped and set up with a pressure transducer. Otherwise, this field displays just 3 dashes.
	Displays current flow rate.
	Move between Run Screens.

Run Screen 2

Use this screen to view or reset the batch totalizer and to view the grand total flow for the system. The grand total cannot be reset.



Key	
	Batch Totalizer - Displays the amount of fluid measured since the last time the field was reset to zero.
	Reset Batch Totalizer - resets the batch totalizer to zero.
	Grand Totalizer - Displays the grand total flow for the system. This value cannot be reset.
	Move between Run Screens.

Run Screens 3 — 6

Use Screens 3–6 to view the log of recent alarms.

			
1.	02/22 14:48	- F2	3
2.	02/22 14:48	- MF	
3.	02/22 14:48	- F2	
4.	02/22 14:36	- F2	
5.	02/22 14:36	- F2	

Key	
	Date on which the Deviation or Advisory Alarm occurred.
	Time at which the Deviation or Advisory Alarm occurred.
	General symbol indicating a deviation or advisory alarm. MF is the maintenance alarm. F2 is the flow rate low alarm. F3 is the flow rate high alarm. See Deviations and Advisories, page 31 , for more information.
	Move between Run Screens.

Enter password to enable entry to the Setup screens. Set the password to 0000 to disable password protection. See Setup Screen 9 to set or change the password.

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Key	
	Enter the screen to enter a password.
	Press to activate a field for editing.
	Move to the right when editing number fields. Press again to accept the entry when all digits are correct.
	Enter the user-set password for the system.
	Increment/decrement the digits when editing number fields.

Password Screen

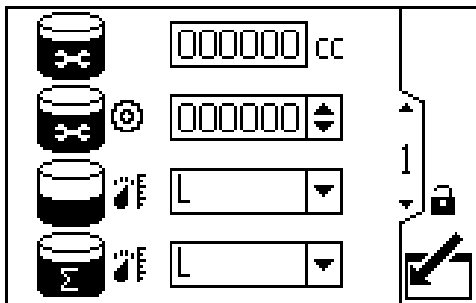
If a password has been set, the Password Screen displays when  is pressed from any Run screen.

Setup Screens

The Setup Mode is used to set up a password (if desired) and to set parameters for controlling and monitoring fluid flow with the ProControl 1KE. See [Screen Navigation and Editing, page 21](#), for information on how to make selections and enter data.

Setup Screen 1

Use this screen to view and reset the maintenance totalizer, set the maintenance target value, and set the batch and grand totalizer units shown on the Run Screens. Maintenance totalizer units, shown on this Setup Screen, are always cc.

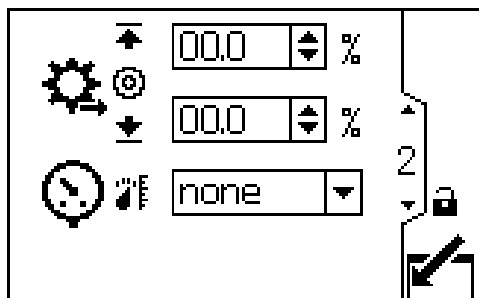


Key	
	Enter the screen to set or change preferences.
	Press to activate a field for editing or to accept the highlighted selection on a dropdown menu.
	Move to the right when editing number fields. Press again to accept the entry when all digits are correct.

	Reset Maintenance Totalizer - resets the maintenance totalizer to zero.
	Maintenance Totalizer - Displays the current maintenance total in cubic centimeters.
	Set your desired maintenance total target value in this field in cubic centimeters. See Setup Screen 4, page 28 , to set or disable the maintenance alarm.
	Batch Totalizer Units - Select from the following drop down options.
	cc Cubic centimeters
	L Liters
	gal Gallons
	Grand Totalizer Units - Select from the following drop down options.
	cc Cubic centimeters
	L Liters
	gal Gallons
	Exit data editing.
	Move between Setup Screens, fields on a screen, or to increment/decrement the digits when editing number fields.

Setup Screen 2

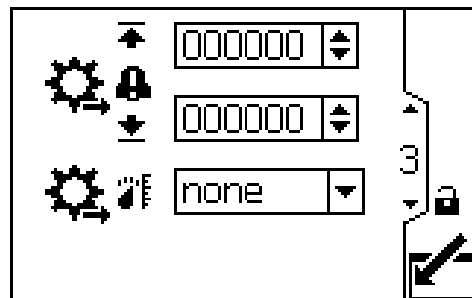
Use this screen to set the upper and lower limits for operator adjustment of flow rate percent and to select your preferred pressure units.



Key	
	Enter the screen to set or change preferences.
	Press to activate a field for editing or to accept the highlighted selection on a dropdown menu.
	Move to the right when editing number fields. Press again to accept the entry when all digits are correct.
	Set your desired upper (first data field) and lower (second data field) fluid flow percent set limits. The Operator can adjust the percentage on Run Screen 1 only within these limits.
	Pressure units — select from the following drop down options.
	none Select if system has no pressure transducer.
	psi
	MPa
	bar
	Exit data editing.
	Move between Setup Screens, fields on a screen, or to increment/decrement the digits when editing number fields.

Setup Screen 3

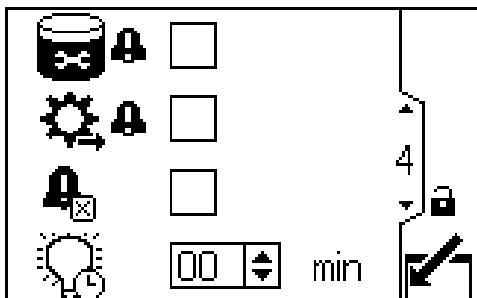
Use this screen to set your flow rate maximum and minimum values and to select your preferred flow rate units.



Key	
	Enter the screen to set or change preferences.
	Press to activate a field for editing or to accept the highlighted selection on a dropdown menu.
	Move to the right when editing number fields. Press again to accept the entry when all digits are correct.
	Set your desired maximum (first data field) and minimum (second data field) flow rates. Flow rates outside of these parameters will trigger an alarm. See Setup Screen 4, page 28 , to set or disable the flow rate alarms.
	Flow Rate Units - Select from the following drop down options.
	none Select if system has no flow meter.
	cc/min
	L/min
	gal/min
	Exit data editing.
	Move between Setup Screens, fields on a screen, or to increment/decrement the digits when editing number fields.

Setup Screen 4

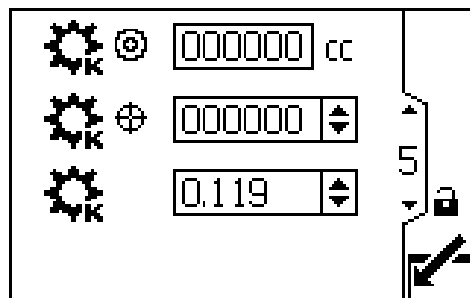
Use this screen to set your alarm preferences. Select  to enable the alarm, or leave the box empty to disable the alarm.



Key	
	Enter the screen to set or change preferences.
	Press to toggle between  and blank.
	Maintenance Totalizer Alarm Enable
	Flow Rate Alarm Enable
	Alarm Auto Clear Enable. If enabled, when the flow rate returns to within the flow limit set points, the flow rate alarm will clear on the screen and on any attached accessories, such as a the light tower.
	Set backlight timer. Enter "00" to set the backlight to remain on.
	Exit data editing.
	Move between Setup Screens, fields on a screen, or to increment/decrement the digits when editing number fields.

Setup Screen 5

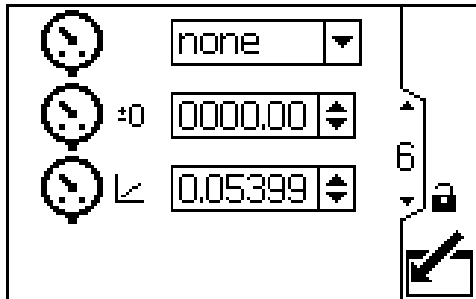
Use this screen to calibrate your meter and to view or set your meter k-factor. See [Calibrate the Meter, page 18](#), for procedure.



Key	
	Enter the screen to set or change preferences.
	Press to activate a field for editing or to accept the highlighted selection on a dropdown menu.
	Move to the right when editing number fields. Press again to accept the entry when all digits are correct.
	Start the calibration.
	Stop the calibration.
	Displays the volume measured by the system for the calibration test.
	Enter the actual volume dispensed into the cylinder for the calibration test.
	Displays the meter k-factor. User can set the k-factor manually. The system automatically updates to the correct k-factor when the meter is calibrated.
	Exit data editing.
	Move between Setup Screens, fields on a screen, or to increment/decrement the digits when editing number fields.

Setup Screen 6

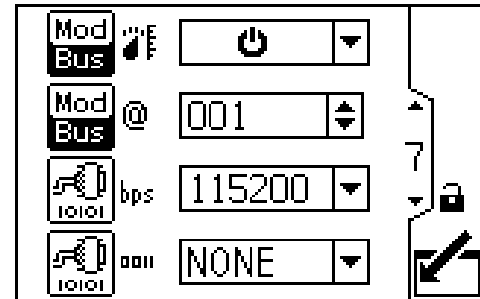
Use this screen to specify your pressure transducer and set its offset and slope.



Key	
	Enter the screen to set or change preferences.
	Press to activate a field for editing or to accept the highlighted selection on a dropdown menu.
	Move to the right when editing number fields. Press again to accept the entry when all digits are correct.
	Select the correct pressure transducer.
	Set the zero offset (the reading on the gauge when no pressure is on the system).
	Pressure transducer slope. This number is a constant representing millivolts per bar. The default matches the selected pressure transducer. Operator adjustable.
	Exit data editing.
	Move between Setup Screens, fields on a screen, or to increment/decrement the digits when editing number fields.

Setup Screen 7

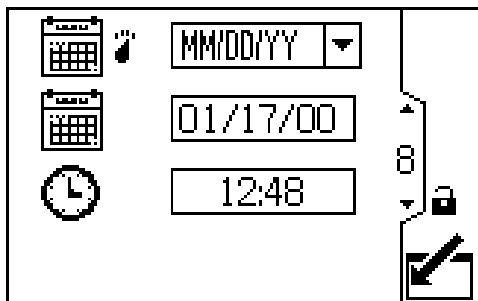
Use this screen to set your modbus preferences for ports 1 and 2. Note that ports 5 and 6 are used as modbus master devices for connecting to other ProControl 1KE (or Informer) modules.



Key	
	Modbus mode. Select off or Slave from the dropdown options.
	Turn off Modbus functionality if not used.
	Use ProControl 1KE as Modbus slave device.
	Enter or change the Modbus address. Value is between 1 and 247.
	Select serial port baudrate from the dropdown options: 9600, 19200, 38400, 57600, or 115200.
	Select serial port parity from the dropdown options: NONE, ODD, or EVEN.
	Exit data editing.
	Move between Setup Screens, fields on a screen, or to increment/decrement the digits when editing number fields.

Setup Screen 8

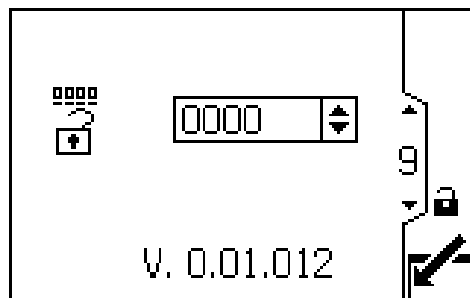
Use this screen to set your date format, date, and time.



Key	
	Enter the screen to set or change preferences.
	Press to activate a field for editing or to accept the highlighted selection on a dropdown menu.
	Move to the right when editing number fields. Press again to accept the entry when all digits are correct.
	Select your preferred date format from the dropdown menu.
	MM/DD/YY
	DD/MM/YY
	YY/MM/DD
	Set the current date.
	Set the current time.
	Exit data editing.
	Move between Setup Screens, fields on a screen, or to increment/decrement the digits when editing number fields.

Setup Screen 9

Use this screen to enter a password that will be required to access the Setup screens. This screen also displays the software version.



Key	
	Enter the screen to set the password.
	Press to activate the field for editing.
	Move to the right when editing number fields. Press again to accept the entry when all digits are correct.
	Enter desired password. Enter "0000" to disable the password.
	Exit data editing.
	Move between Setup Screens, fields on a screen, or to increment/decrement the digits when editing number fields.

Deviations and Advisories

There are two types of errors that can occur. Errors are indicated on the display.

Deviations, indicated by , require attention, but not immediately.

Advisories, indicated by , do not require attention.

If a deviation or advisory occurs, the system continues running. The error code and the 

or the  flash on the screen. If multiple alarms occur, F2 and F3 have higher priority than MF. They will appear first and must be cleared first.

Alarm Log Logic: If Alarm Auto Clear is enabled, the system will not log the same alarm twice. For example, if the system goes back forth between low flow (F2) and normal, the system will log this error only once, to keep the log from filling up before the operator corrects the condition.

If Alarm Auto Clear is not enabled, each alarm will log only **once** if the operator corrects the condition **and then** clears the alarm. The alarm will log twice if the operator clears the alarm before correcting the condition.

The following table explains the error type that is associated with each error code and icon.

Deviations and Advisories		
Icon and Code	Description	How to Correct and Clear
 MF	Advisory alarm. If enabled, the maintenance totalizer alarm displays when the user-set maintenance target value is reached.	Reset Maintenance Totalizer to zero (see Setup Screen 1, page 26). Perform maintenance. Press  to clear alarm. Alarm will not clear until Maintenance Totalizer has been reset to zero.
 F2	Deviation alarm. If enabled, the flow rate low alarm displays when the flow rate is lower than the user set minimum.	Adjust flow rate, reset minimum flow target (see Setup Screen 3, page 27), or disable alarm (see Setup Screen 4, page 28). Press  to clear screen. The alarm will not clear if the flow rate is still lower than the user set target.
 F3	Deviation alarm. If enabled, the flow rate high alarm displays when the flow rate is higher than the user set maximum.	Adjust flow rate, reset maximum flow target (see Setup Screen 3, page 27), or disable alarm (see Setup Screen 4, page 28). Press  to clear alarm. The alarm will not clear if the flow rate is still higher than the user set target.

Troubleshooting

Problem	Cause	Solution
ProControl 1KE is completely dark.	Power is not on.	Turn power supply on.
	Loose or disconnected power cable.	Tighten or connect cable.
ProControl 1KE has power but does not function.	Hardware failure.	Replace ProControl 1KE.
Pressure or Flow Rate reads 0 when fluid is flowing.	Loose or disconnected flow meter/pressure transducer cable.	Check the digital input/output cable going to/from the meter.
Pressure or Flow Rate reads — — all the time.	Units in Setup are set to NONE, indicating that the system has no pressure transducer and/or fluid meter.	Choose preferred units for each device present. See Setup Screen 2, page 27 , for pressure, Setup Screen 3, page 27 , for flow rate.
Inaccurate flow reading	Faulty flow meter sensor or meter.	Replace sensor or meter.
	Meter needs calibration.	Calibrate meter. See Calibrate the Meter, page 18 .
Inaccurate pressure range	Wrong transducer is selected.	Choose the correct transducer from the options in Setup Screen 6, page 29 .
	Offset or slope are set incorrectly.	Review and correct settings for the pressure offset (mV) and slope (mV/bar). See Setup Screen 6, page 29 .
Display readout faulty.	Excessive static discharge.	Replace ProControl 1KE.
	Ambient temperature too high.	Lower ambient temperature.
Communication failure	Incorrect data addresses.	Check address configuration.
	Incorrect communication parameters.	Check communication parameters.
	Incorrect cabling.	Check cabling and wiring. See Installation, page 9 .
Fluid is not flowing.	Clogs in fluid line or in meter.	Clean fluid line and/or meter. See meter manual.
	Gears worn or damaged.	Service meter. See meter manual.
Low flow	Inadequate air supply through the I/P transducer.	Increase incoming air pressure.

Diagnostic Information

The LEDs on the bottom of the ProControl 1KE give important information about system function.

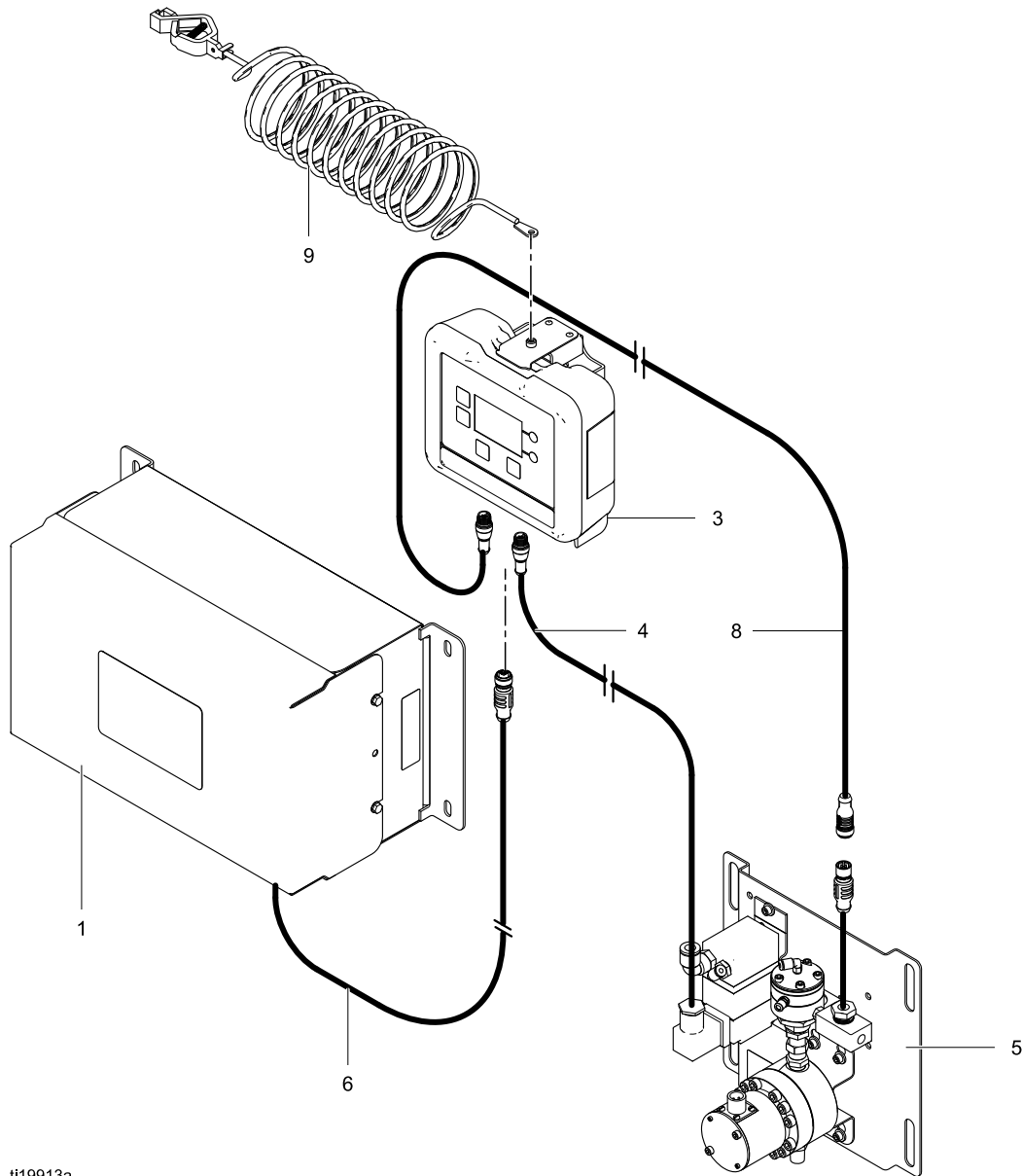
LED Signals

Signal	Description
Green On	ProControl 1KE is powered up.
Yellow	Internal communication in progress.
Red solid	ProControl 1KE failure. See Troubleshooting.
Red flashing	Software is updating.
Red flashing slowly	Token error; remove token and upload software token again.

Parts

Kits for Hazardous Location

24L085, 24P593, 24P595, 24L087, 24P597, 24L089, 24L091



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Table 4 Parts for Hazardous Location Kits

Ref.	Part	Description	Qty.
1	16M167	POWER SUPPLY; 90–264 VAC input, 15 VDC output. <i>See Manual 332196. Not included in Kits 24R261, 24R262, and 24R263.</i>	1
3	24L083	MODULE, ProControl 1KE, includes 3a-3c	1
3a	— — —	MODULE, ProControl 1KE, with software	
3b	277853	BRACKET	
3c▲	16P265	LABEL, warning, not shown	
4	16V142	CABLE, intrinsically safe*, fluid control, 16 m (52.5 ft)	1
5	— — —	See Fluid and Air Control Parts, page 38 .	
6	16K509	CABLE, power, intrinsically safe*, 50 ft. (15 m)	1
8	16V381	CABLE, intrinsically safe*, pressure transducer; included in Kits 24L089, 24P593, and 24P597	1
9	244524	GROUND WIRE, assembly with clamp	1
* Intrinsically safe cables are identified by the blue tags installed on the cables.			

▲ Replacement Danger and Warning labels, tags, and cards are available at no cost.

Kits for Non-Hazardous Location
24L084, 24L086, 24L088, 24L090, 24P592, 24P594, 24P596

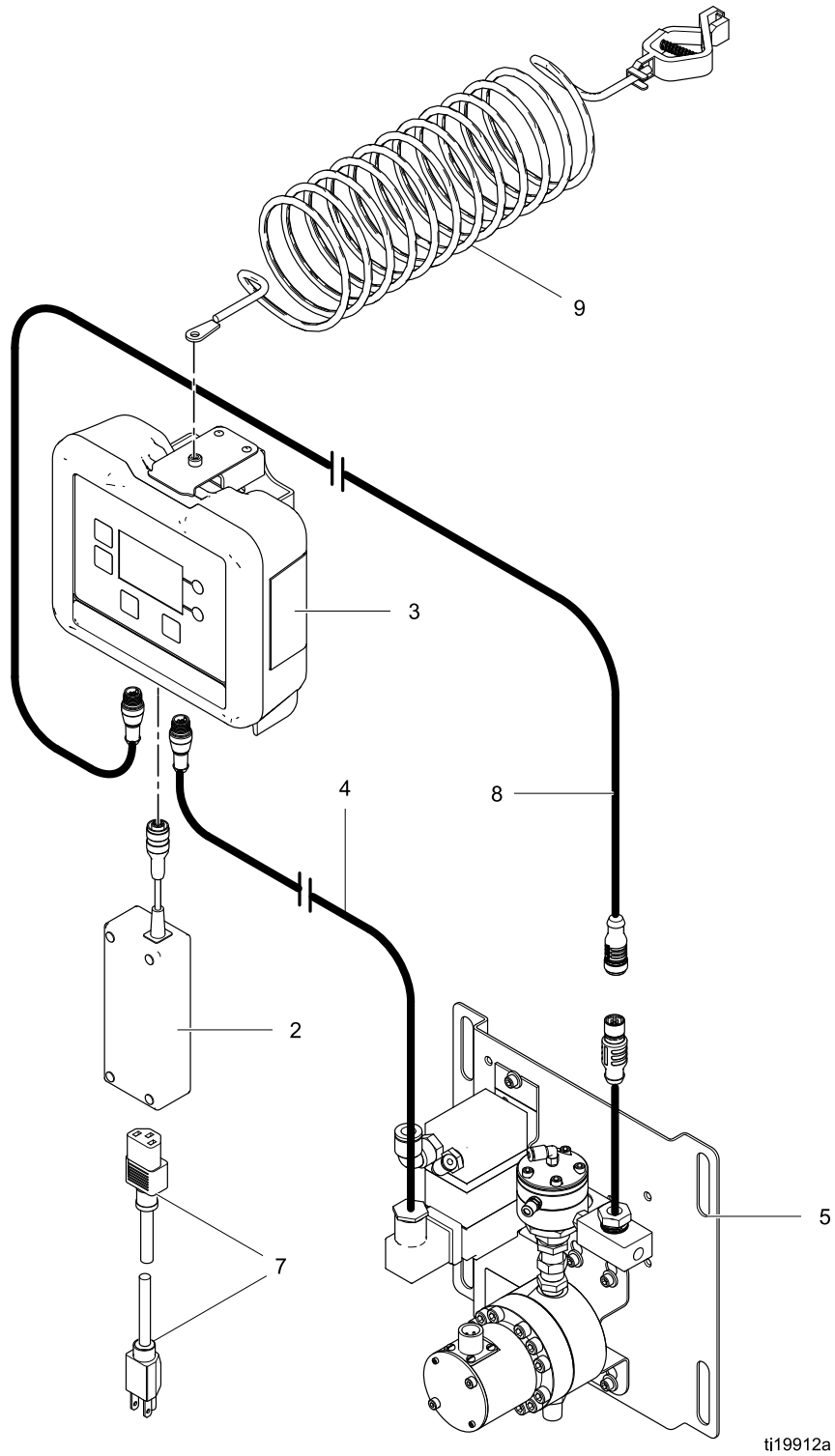
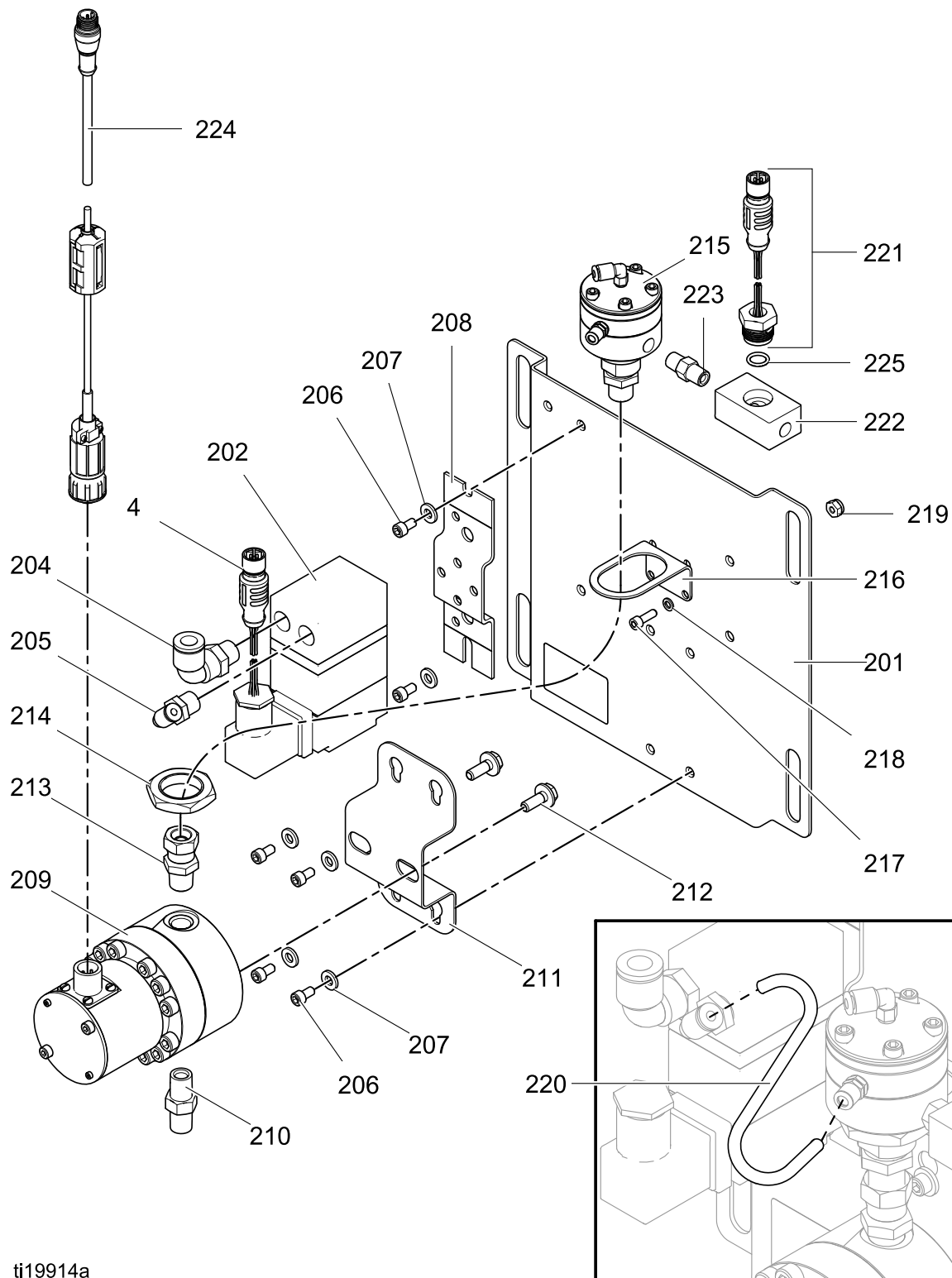


Table 5 Parts for Non-Hazardous Location Kits

Ref.	Part	Description	Qty.
2	16V680	POWER SUPPLY, 90–264 VAC input, 15 VDC output	1
3	24L083	MODULE, ProControl 1KE, includes 3a-3c	1
3a	— — —	MODULE, ProControl 1KE, with software	
3b	277853	BRACKET	
3c▲	16P265	LABEL, warning, not shown	
4	16P790	CABLE, fluid control	1
5	— — —	See Fluid and Air Control Parts, page 38 .	1
7	245202	CORD, set, power, 10 ft (3 m), 13 Amp, 120 V	1
8	16V380	CABLE, pressure transducer; included in Kits 24L088, 24P592, and 24P596	1
9	244524	GROUND WIRE, assembly with clamp	1

▲ Replacement Danger and Warning labels, tags, and cards are available at no cost.

Fluid and Air Control Parts



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Table 6 Fluid and Air Control Parts, Models 24L084, 24L085, 24L086, 24L087

Ref.	Part	Description	Qty.	24L084, 24R263	24L085	24L086	24L087, 24R262
201	16E841	PANEL, mounting	1	✓	✓	✓	✓
202	16P784	TRANSDUCER, I/P; includes ref. 208	1	✓	✓	✓	✓
4	16P790	CABLE, fluid control	1	✓		✓	
	16V142	CABLE, fluid control, IS	1		✓		✓
204	121141	SWIVEL, elbow	1	✓	✓	✓	✓
205	15T937	SWIVEL, elbow	1	✓	✓	✓	✓
206	104371	SCREW, #10	2 or 6	✓	✓	✓	✓
207	104116	WASHER, #10	2 or 6	✓	✓	✓	✓
208	— — —	BRACKET, transducer	1	✓	✓	✓	✓
209	289813	METER, G3000	1			✓	✓
210	501867	VALVE, check	1			✓	✓
211	15U749	BRACKET, meter	1			✓	✓
212	114182	SCREW, M6`	2			✓	✓
213	114339	SWIVEL, union	1			✓	✓
214	- — —	NUT, hex, 1–12 unf	1	✓	✓	✓	✓
215	24C375	REGULATOR, fluid; includes refs. 214, 216, and 217	1	✓	✓	✓	✓
216	— — —	BRACKET, regulator	1	✓	✓	✓	✓
217	112310	SCREW, #8	2	✓	✓	✓	✓
218	100079	WASHER, lock, #8	2	✓	✓	✓	✓
219	109466	NUT, #8	2	✓	✓	✓	✓
220	— —	TUBE, air	1	✓	✓	✓	✓
221	24P600	TRANSDUCER, pressure, includes fitting (ref. 222) and o-ring (ref. 225)	1				
222	— — —	FITTING, pressure transducer	1				
223	124843	FITTING	1				
224	16K483	CABLE, meter	1			✓	
	16V074	CABLE, meter, IS	1				✓
225	113116	O-RING	1				

Table 7 Fluid and Air Control Parts, Models 24L088, 24L089, 24L090, 24L091

Ref.	Part	Description	Qty.	24L088	24L089	24L090	24L091
201	16E841	PANEL, mounting	1	✓	✓		
202	16P784	TRANSDUCER, I/P; includes ref. 208	1	✓	✓	✓	✓
4	16P790	CABLE, fluid control	1	✓		✓	
	16V142	CABLE, fluid control, IS	1		✓		✓
204	121141	SWIVEL, elbow	1	✓	✓		
205	15T937	SWIVEL, elbow	1	✓	✓		
206	104371	SCREW, #10	6	✓	✓		
207	104116	WASHER, #10	6	✓	✓		
208	— — —	BRACKET, transducer	1	✓	✓	✓	✓
209	289813	METER, G3000	1	✓	✓		
210	501867	VALVE, check	1	✓	✓		
211	15U749	BRACKET, meter	1	✓	✓		
212	114182	SCREW, M6`	2	✓	✓		
213	114339	SWIVEL, union	1	✓	✓		
214	— — —	NUT, hex1–12 unf	1	✓	✓		
215	24C375	REGULATOR, fluid; includes refs. 214, 216, and 217	1	✓	✓		
216	— — —	BRACKET, regulator	1	✓	✓		
217	112310	SCREW, #8	2	✓	✓		
218	100079	WASHER, lock, #8	2	✓	✓		
219	109466	NUT, #8	2	✓	✓		
220	— —	TUBE, air	1	✓	✓		
221	16H282	TRANSDUCER, pressure	1	✓	✓		
222	24P600	TRANSDUCER, pressure, includes fitting (ref. 222) and o-ring (ref. 225)	1	✓	✓		
223	— — —	FITTING, pressure transducer	1	✓	✓		
224	16K483	CABLE, meter	1	✓			
	16V074	CABLE, meter, IS	1		✓		
225	111316	O-RING	1	✓	✓		

Table 8 Fluid and Air Control Parts, Models 24P592, 24P593, 24P594

Ref.	Part	Description	Qty.	24P592	24P593	24P594
201	16E841	PANEL, mounting	1			✓
202	16P784	TRANSDUCER, I/P; includes ref. 208	1	✓	✓	✓
4	16P790	CABLE, fluid control	1	✓		✓
	16V142	CABLE, fluid control, IS	1		✓	
204	121141	SWIVEL, elbow	1			
205	15T937	SWIVEL, elbow	1			
206	104371	SCREW, #10	6			✓
207	104116	WASHER, #10	6			✓
208	— — —	BRACKET, transducer	1	✓	✓	✓
209	289813	METER, G3000	1			✓
210	501867	VALVE, check	1			✓
211	15U749	BRACKET, meter	1			✓
212	114182	SCREW, M6`	2			✓
213	114339	SWIVEL, union	1			
214	— — —	NUT, hex1–12 unf	1			
215	24C375	REGULATOR, fluid; includes refs. 214, 216, and 217	1			
216	— — —	BRACKET, regulator	1			
217	112310	SCREW, #8	2			
218	100079	WASHER, lock, #8	2			
219	109466	NUT, #8	2			
220	— — —	TUBE, air	1			
221	24P600	TRANSDUCER, pressure, includes fitting (ref. 222) and o-ring (ref. 225)	1	✓	✓	
222	— — —	FITTING, pressure transducer	1	✓	✓	
223	124843	FITTING	1			
224	16K483	CABLE, meter	1			✓
	16V074	CABLE, meter, IS	1			
225	111316	O-RING	1	✓	✓	

Table 9 Fluid and Air Control Parts, Models 24P595, 24P596, 24P597

Ref.	Part	Description	Qty.	24P595, 24R261	24P596	24P597
201	16E841	PANEL, mounting	1	✓	✓	✓
202	16P784	TRANSDUCER, I/P; includes ref. 208	1	✓	✓	✓
4	16P790	CABLE, fluid control	1		✓	
	16V142	CABLE, fluid control, IS	1	✓		✓
204	121141	SWIVEL, elbow	1		✓	✓
205	15T937	SWIVEL, elbow	1		✓	✓
206	104371	SCREW, #10	6	✓	✓	✓
207	104116	WASHER, #10	6	✓	✓	✓
208	— — —	BRACKET, transducer	1	✓	✓	✓
209	289813	METER, G3000	1	✓		
210	501867	VALVE, check	1	✓		
211	15U749	BRACKET, meter	1	✓		
212	114182	SCREW, M6`	2	✓		
213	114339	SWIVEL, union	1			
214	— — —	NUT, hex1–12 unf	1		✓	✓
215	24C375	REGULATOR, fluid; includes refs. 214, 216, and 217	1		✓	✓
216	— — —	BRACKET, regulator	1		✓	✓
217	112310	SCREW, #8	2		✓	✓
218	100079	WASHER, lock, #8	2		✓	✓
219	109466	NUT, #8	2		✓	✓
220	— —	TUBE, air	1		✓	✓
221	24P600	TRANSDUCER, pressure, includes fitting (ref. 222) and o-ring (ref. 225)	1		✓	✓
222	— — —	FITTING, pressure transducer	1		✓	✓
223	124843	FITTING	1		✓	✓
224	16K483	CABLE, meter	1			
	16V074	CABLE, meter, IS	1	✓		
225	111316	O-RING	1		✓	✓

Table 10 I/P Transducer Connection Points

Pin (Ref. 4, F/C Cable)	Wire Color	Function	Pin (Ref. 202, Transducer)
5	Gray	Control A	1
7	Blue	Common	2

Accessories

					
Not all accessories and kits are approved for use in hazardous locations. Refer to the specific accessory and kit manuals for approval details.					

Accessories for Hazardous Locations

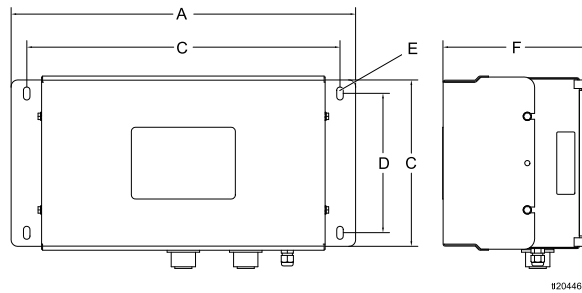
Part No.	Description
16V077	Cable Extension, 50 ft (15 m), for meter
16K615	Power Cable, 100 ft (30 m), for power supply
16K509	Power Cable, 50 ft (15 m), for power supply
16M172	Fiber Optic Cable, 50 ft (15 m)
16M173	Fiber Optic Cable, 100 ft (30 m)
16V381	Cable, M12, reverse key, 5-pin
289814	G3000HR Meter, Positive displacement, gear flow meter, 0.01 to 0.5 gpm (38 to 1900 cc/min.), for low to medium viscosity materials
280560	HG6000 Meter, Positive displacement, helical gear flow meter, 0.013 to 6.0 gpm (50 to 22,712 cc/min.), for high flow, high viscosity materials
258718	S3000 Solvent Meter, Positive displacement, gear flow meter, 0.01 to 0.5 gpm (38 to 1900 cc/min.), for light viscosity materials
24N525	Coriolis Meter, Non-intrusive mass flow meter, for abrasive and filled materials, range of flow rates and materials
24C471	Fluid Regulator, 1:2, low flow
24C472	Fluid Regulator, 1:3, low flow

570122	Air Filter and Regulator assembly, includes mounting bracket
24P600	Pressure Transducer (low pressure). Also purchase Hazardous Location Cable 16V381* to connect the transducer to the ProControl 1KE
24R906	Pressure Transducer (high-pressure), includes transducer, o-ring, and fitting. Also purchase Hazardous Location Cable 16V381* to connect the transducer to the ProControl 1KE
* If using the pressure transducer in a Non-Hazardous location, purchase Cable 16V380 instead.	

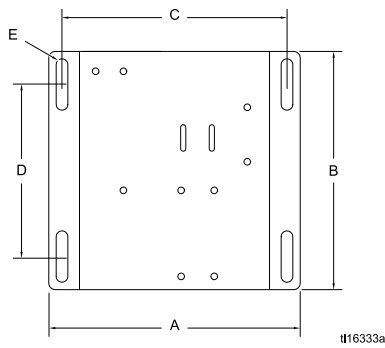
Accessories for Non-Hazardous Locations

Part No.	Description
16P467	Power Barrier Kit, includes power barrier, terminal blocks, wiring, and power cable. Add to the power supply to power an additional ProControl 1KE (or Informer).
16K484	Cable Extension, 50 ft (15 m), for meter
16K465	Fiber Optic to Serial Converter, use to communicate from the ProControl 1KE to a PLC.
15V337	Advanced Web Interface Module, use to communicate from the ProControl 1KE to a PLC via ethernet.
24N807	Light Tower Kit, includes tower and splitter cable
16V380	Cable, M12, reverse key, 5-pin
24P006	Digital IO Accessory Cable Kit, includes cable and splitter cable for connecting a light tower or other accessory to the ProControl 1KE system.

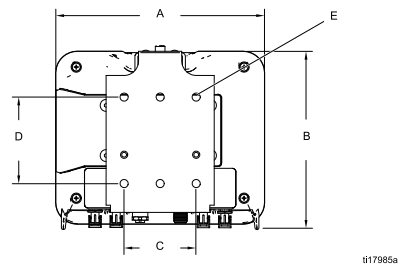
Mounting Dimensions



Power Supply 16M167



Fluid and Air Controls Mounting Panel



ProControl 1KE Module

Component	A Overall Width in. (mm)	B Overall Height in. (mm)	Overall Depth in. (mm)	Mounting Dimensions Width (C) x Height (D) in. (mm)	E Mounting Hole Size in. (mm)
Fluid and Air Controls Mounting Panel	9.5 (241.3)	9.0 (228.6)	0.5 (12.7)	8.5 x adjustable from 5.0–8.0 (212.5 x 127.0–203.2)	0.5 (12.7)
Power Supply 16M167	16.6 (420.9)	8.7 (221.2)	4.5 (114.8)	15.1 x 6.7 (382.8 x 170.2)	0.31 (7.9)
ProControl 1KE	7.2 (183)	6.0 (152)	2.8 (71)	2.5 x 3.0 (64 x 76)	0.28 (7)

Appendix A - Modbus Variable Map

Table 11 Device Identification Registers

Register Permissions	Informer Modbus Register	Description	Size	Units
Read Only	401040	Software Version Major	32 Bit	String, 4 Bytes
Read Only	401042	Software Version Minor	32 Bit	String, 4 Bytes
Read Only	401044	Software Version Build	32 Bit	String, 4 Bytes
Read Only	401072	Serial Number String - Bytes 0-3	32 Bit	String, 4 Bytes
Read Only	401074	Serial Number String - Bytes 4-7	32 Bit	String, 4 Bytes
Read Only	401076	Serial Number String - Bytes 8-11	32 Bit	String, 4 Bytes
Read Only	401078	Serial Number String - Bytes 12-15	32 Bit	String, 4 Bytes
Read Only	401080	Serial Number String - Bytes 16-19	32 Bit	String, 4 Bytes
Read Only	401082	Serial Number String - Bytes 20-23	32 Bit	String, 4 Bytes
Read Only	401084	Serial Number String - Bytes 24-27	32 Bit	String, 4 Bytes
Read Only	401086	Serial Number String - Bytes 28-31	32 Bit	String, 4 Bytes

Table 12 Run Registers

Register Permissions	Informer Modbus Register	Description	Size	Units	Low Limit	High Limit	Notes
Read/Write	402000	Date, Year	16 Bit	YY	1	99	
Read/Write	402001	Date, Month	16 Bit	MM	1	12	
Read/Write	402002	Date, Day	16 Bit	DD	1	31	
Read/Write	402003	Time, Hour	16 Bit	HH	0	23	
Read/Write	402004	Time, Minute	16 Bit	MM	0	60	
Read/Write	402005	Time, Second	16 Bit	SS	0	60	
Read/Write	402006	Alarms Needing Acknowledgment	32 Bit	Bitfield alarms	0	0	0b0001— High flow alarm; 0b0010 — Low Flow alarm; 0b0100 — Maint. Target Set bit to 0 to reset
Read Only	402008	Current Grand Total	32 Bit	cc	0	32-bit	
Read/Write	402010	Current Batch Total	32 Bit	cc	0	999999	Write 0 to reset
Read/Write	402012	Current Maintenance Total	32 Bit	cc	0	999999	Write 0 to reset

Register Permissions	Informer Modbus Register	Description	Size	Units	Low Limit	High Limit	Notes
Read Only	402014	Current Flow Rate	32 Bit	cc/min	0	65536	
Read Only	402016	Current Pressure	32 Bit	bar	0	65536	x 1000
Read	402018	Current Pressure Target	16 Bit	percent	0	999	0 to 99.9 percent
Read/Write	402019	Calibration Mode	16 Bit	0=off, 1=on	0	1	
Read/Write	402020	Calibration, Measured Volume	32 Bit	pulses	0	32-bit	
Read/Write	402022	Calibration, Actual Dispensed Volume	32 Bit	cc	0	32-bit	

Table 13 Setup Registers

Register Permissions	Informer Modbus Register	Description	Size	Units	Low Limit	High Limit	Notes
Read/Write	403000	Communication, Modbus Mode	16 Bit	0=off, 1=on	0	1	
Read/Write	403001	Communication, Modbus Address	32 Bit	1-247	1	247	
Read/Write	403003	Communication, Modbus Baud Rate	16 Bit	0=9600, 1=19200, 2=38400, 3=578600, 4=115200	0	4	
Read/Write	403004	Communication, Modbus Parity	16 Bit	0=None, 1=Odd, 2=Even	0	2	
Read/Write	403005	Communication, Modbus StopBits	16 Bit	none	1	2	
Read/Write	403006	Display, Date Format	16 Bit	0=mm/dd/yy, 1=dd/mm/yy, 2=yy/mm/dd	0	2	
Read/Write	403007	Display, Backlight Timer	16 Bit	min	0	99	
Read/Write	403008	Display, Maintenance Totalizer Alarm Enable	16 Bit	0=off, 1=on	0	1	
Read/Write	403009	Display, Flow Rate Alarm Enable	16 Bit	0=off, 1=on	0	1	
Read/Write	403010	Display, Alarm Auto Clear	16 Bit	0=off, 1=on	0	1	
Read/Write	403011	Flow Meter Enable	16 Bit	0=off, 1=on	0	1	
Read/Write	403012	Pressure Transducer Enable	16 bit	0=off, 1=on	0	1	
Read/Write	403013	Units, Flow Rate	16 Bit	0=cc/min, 1=l/min, 2=gal/min	0	2	
Read/write	403014	Units, Pressure	16 Bit	0=psi, 1=bar, 2=MPa	0	2	
Read/Write	403015	Units, Batch Volume	16 Bit	0=cc, 1=l, 2=gal	0	2 (/1000)	
Read/Write	403016	Units, Grand Volume	16 Bit	0=cc, 1=l, 2=gal	0	2	
Read/Write	403017	System, Maintenance Target	32 Bit	cc	0	999999	

Register Permissions	Informer Modbus Register	Description	Size	Units	Low Limit	High Limit	Notes
Read/Write	403019	System, Fluid Flow Percent Maximum Set Point	16 Bit	percent	0	999	0 to 99.9 percent
Read/Write	403020	System, Flow Percent Minimum Set Point	16 Bit	percent	0	999	0 to 99.9 percent
Read/Write	403021	System, Flow Rate Maximum	32 Bit	cc	0	999000	
Read/Write	403023	System, Flow Rate Minimum	32 Bit	cc	0	999000	
Read/Write	403025	System, Meter K-Factor	16 Bit	cc	10	5000	0.010 to 5.000 cc
Read/Write	403026	System, Pressure Transducer Type	16 Bit	0=Type 1, 1=Type 2	0	1	Type 1. 100 psi Type 2. 7500 psi
Read/Write	403027	System, Pressure Transducer Offset	32 Bit	mV	0	999999	0 to 9999.99 mV
Read/Write	403029	System, Pressure Transducer Scale	32 Bit	mV/Bar	0	999999	0 to 9.99999 mV/Bar

Appendix B - Advanced Web Interface

Overview

The Advanced Web Interface (AWI) is Graco PN 15V337. It is an accessory that works with many Graco devices to enable communication with a PC via ethernet. The kit includes Manual 332459, which contains installation and setup information common to all devices. It includes sections on how to configure your computer, initialize the system, configure the main system settings, and set up your network. Refer to Manual 332459 first, then return to this Appendix for information specific to the ProControl 1KE.

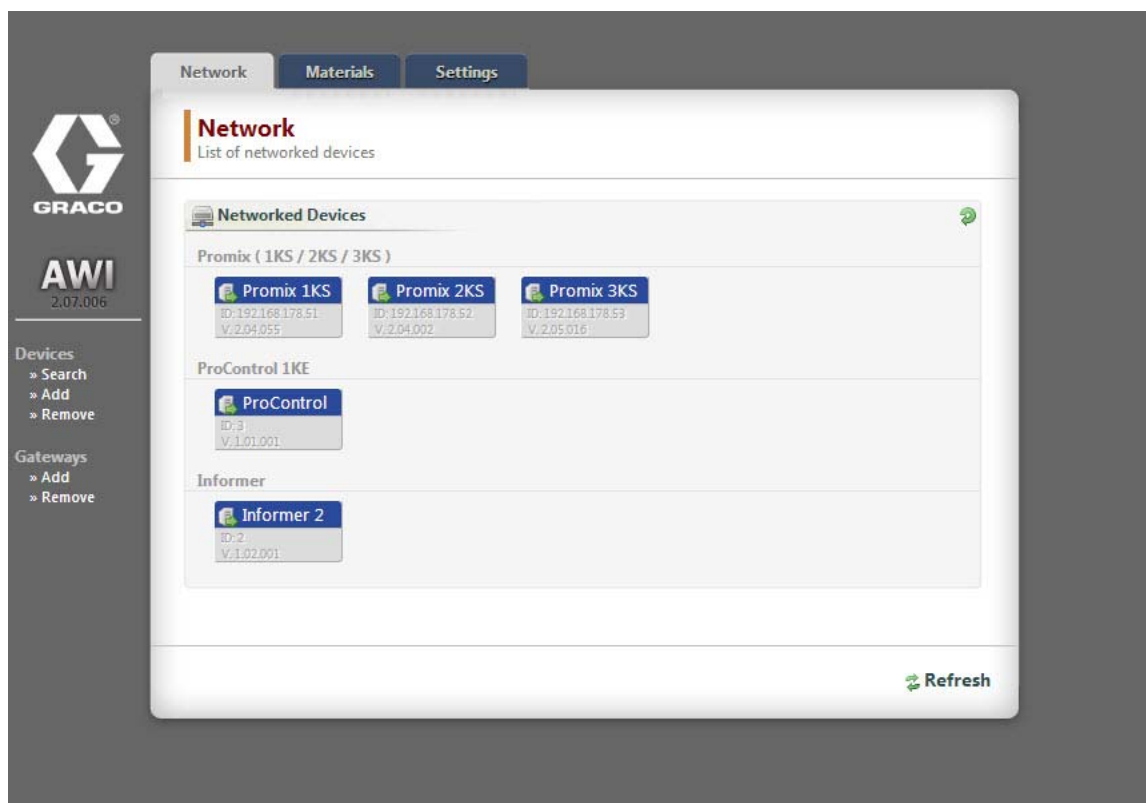
NOTE: A modbus gateway (Graco PN 24N977, sold separately) and a Fiber Optic to Serial Converter (Graco PN 24N978, sold separately) are required to enable the ProControl 1KE to communicate with the AWI.

NOTE: The AWI must be version 3.01.001 or greater.

Network Tab

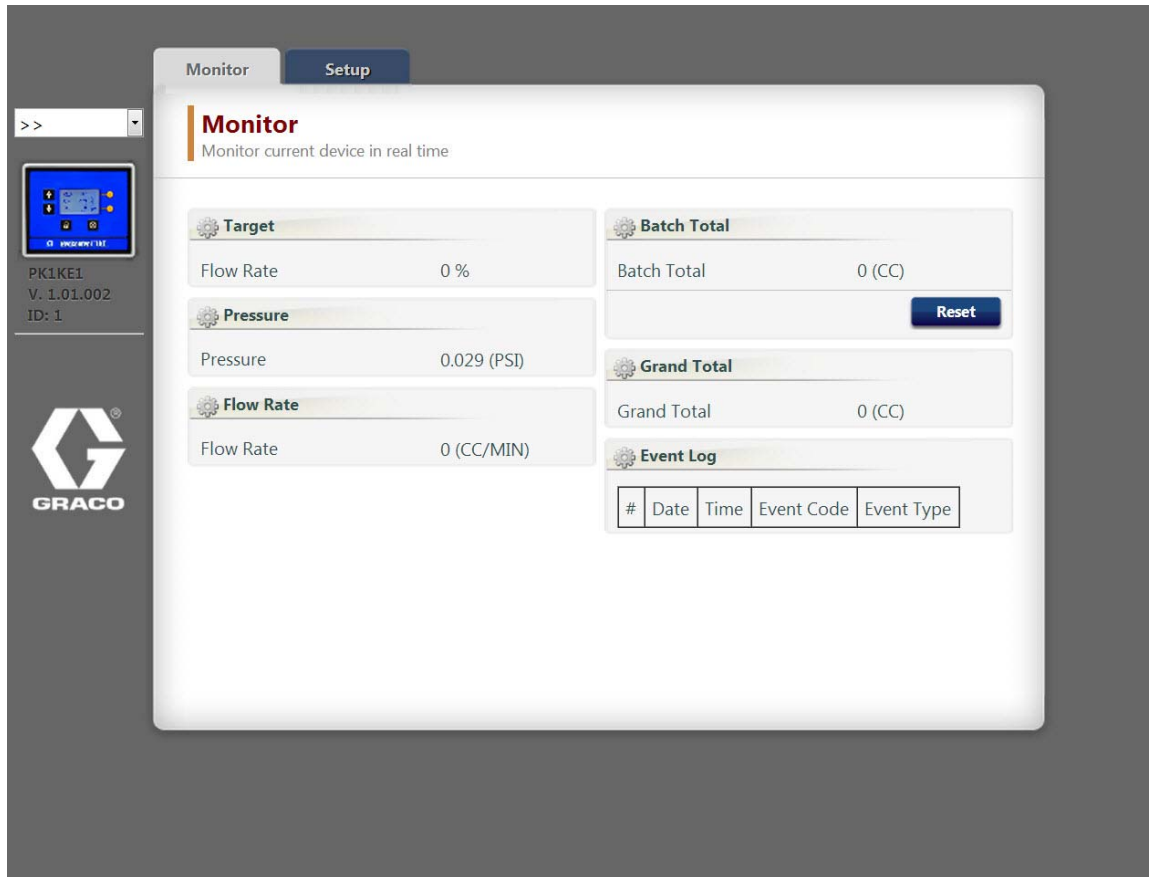
When you have finished setting up the system as directed in Manual 332459, select the **Network Tab**. It should show at least one ProControl 1KE on the list of networked devices. Click on the icon for the ProControl 1KE you desire.

NOTE: If you still need to search for or manually add ProControl 1KE systems, see the Network Tab instructions in Manual 332459.



Monitor Tab

Use this tab to monitor the current device in real time. The only change that can be made on this tab is to reset the batch total. Click **Reset** to change the batch total immediately to zero.



The screenshot displays the 'Monitor' tab of the Graco Advanced Web Interface. On the left sidebar, there is a dropdown menu with '>>' selected, a small device icon, and the text 'PK1KE1', 'V. 1.01.002', and 'ID: 1'. Below this is the Graco logo. The main content area has two tabs: 'Monitor' (active) and 'Setup'. The 'Monitor' section is titled 'Monitor' with the subtitle 'Monitor current device in real time'. It contains four data panels: 'Target' showing 'Flow Rate' at '0 %'; 'Pressure' showing 'Pressure' at '0.029 (PSI)'; 'Flow Rate' showing 'Flow Rate' at '0 (CC/MIN)'; and 'Batch Total' showing 'Batch Total' at '0 (CC)' with a 'Reset' button. Below these is a 'Grand Total' panel showing 'Grand Total' at '0 (CC)'. At the bottom right is an 'Event Log' table with columns: '#', 'Date', 'Time', 'Event Code', and 'Event Type'.

#	Date	Time	Event Code	Event Type
---	------	------	------------	------------

Setup Tab

Click on **Setup**. Use this tab to view or change your ProControl 1KE settings. For items with a field, type the desired number in the field and press **Enter** on your keyboard. The change takes place when you

press **Enter**. For drop-down menus, click on the desired option. The change is immediate.

The screenshot displays the 'Setup' tab of the ProControl 1KE web interface. The interface is organized into several sections for configuring system parameters:

- Target:**
 - Maintenance Target (cc): 0
 - Max Flow Target (%): 51
 - Min Flow Target (%): 50
 - Maximum Flow (cc/min): 0
 - Minimum Flow (cc/min): 0
- Events:**
 - Maintenance Alarm: Off
 - Flow Alarm: Off
 - Auto Clear: Off
 - Backlight Timer (min): 0
- Units:**
 - Pressure Sensor: Disable
 - Pressure: PSI
 - Flow Meter: Enable
 - Flow Rate: cc/min
 - Batch Total: cc
 - Grand Total: cc
- Modbus:**
 - Modbus Mode: On
 - Modbus Address: 1
 - Modbus Baudrate: 115200
 - Modbus Parity: NONE
- K-Factor:**
 - K-Factor: 0.119
- Device Name:**
 - Device Name: PK1KE1
- Date and Time:**
 - Date Format: MM/DD/YY
 - Date: 06 / 04 / 13
 - Time: 14 : 28

The left sidebar contains a monitor icon, the device ID 'PK1KE1', version 'V. 1.01.002', ID '1', and the GRACO logo.

Target

In this screen section, view or adjust your maintenance target, the upper and lower limits for operator adjustment of flow rate percent, and maximum and minimum flow rate values. Type the desired number in the field. Changes made to the upper and lower flow rate targets will take effect the next time the operator enters a new flow rate on the ProControl 1KE Module.

Target	
Maintenance Target (cc)	0
Max Flow Target (%)	51
Min Flow Target (%)	50
Maximum Flow (cc/min)	0
Minimum Flow (cc/min)	0

Units

In this screen section, view or adjust the desired units for pressure, flow rate, batch total, and grand total. Also enable or disable the pressure sensor and flow meter. Use the dropdown menu for each to select different units, or to toggle between **Enable** and **Disable**, if desired.

Units	
Pressure Sensor	Disable
Pressure	PSI
Flow Meter	Enable
Flow Rate	cc/min
Batch Total	cc
Grand Total	cc

K-Factor

In this screen section, view or adjust the k-factor for the system's meter. See [Calibrate the Meter, page 18](#).

K-Factor	
K-Factor	0.119

Device Name

In this screen section, type a name in the field to help you differentiate among ProControl1KEs, if you are using more than one.

Device Name	
Device Name	PK1KE 1

Events

In this screen section, view or adjust the alarm settings and backlight timer. Use the dropdown menus to toggle between **On** and **Off** for the maintenance alarm, flow alarm, and auto clear. For the backlight timer, type a number in the field to correspond to the number of minutes the display can be idle before it turns off the backlight to save power.

Events	
Maintenance Alarm	Off
Flow Alarm	Off
Auto Clear	Off
Backlight Timer (min)	0

Modbus

In this screen section, view the modbus mode, address, baud rate, and parity. Modbus information must be adjusted on the ProControl 1KE. If you were to adjust it on your PC, the change would cause a disruption in your connection.

Modbus	
Modbus Mode	On
Modbus Address	2
Modbus Baudrate	115200
Modbus Parity	NONE

Date and Time

In this screen section, view or adjust the date format, date, or time. Use the dropdown menu to select a new date format, if desired. For date and time, type the correct information in the field.

 **Date and Time**

Date Format	MM/DD/YY ▾
Date	05 / 16 / 13
Time	9 : 1

Technical Data

	US	Metric
Maximum Pressures:		
Maximum inlet air pressure I/P transducer	130 psig	10.3 bar
Maximum fluid working pressure		
289813 G3000 Meter	4000 psi	28 MPa, 276 bar
24C375 Fluid Regulator	100 psi	0.7 MPa, 7 bar
Maximum fluid inlet pressure		
24C375 Fluid Regulator	300 psi	2.1 MPa, 21 bar
Power In Requirements:		
Voltage:	90–264 VAC	
Frequency:	50-60 Hz	
Phase:	1	
Amps:	1.25A maximum	
Power Out Requirements:		
Power Supply 16V680	15 VDC, 1.2 A maximum	
Power Supply 16M167	15 VDC, 160mA maximum	
Environmental		
Operating Temperature	32°-122°F	0°-50°C
Storage Temperature	–22°-140°F	–30°-60°C
Humidity	0 to 95 percent, non-condensing	
Display housing is solvent resistant.		
Wetted Parts		
Meter	See G3000 meter manual (308778) or Coriolis meter manual (313599)	
Fluid Regulator	See Fluid Regulator Manual (3A0427)	
Fittings	Stainless Steel	
Weight		
ProControl 1KE	1.5 lb	0.68 kg
Mounting Bracket	1 lb	0.45 kg
Power Supply 16M167	9 lb	4.1 kg
Fluid Plate (fully populated)	10.5 lb	4.76 kg

Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

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